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ABSTRACT

This report describes a study on the development of children's conceptualizations of written language, that is, their graphic sense. The study investigated three issues: (1) whether acquisition of literacy is a developmental process common to all normal children, (2) whether the levels of graphic sense tend to be associated with particular sociographic background variables, and (3) whether a relationship can be demonstrated between graphic sense level and performance on traditional measures of readiness and achievement. A total sample of 114 children from kindergarten and first grade were chosen. Of these, 43 children were in the general school enrollment and the others were from the bilingual education program of Calistoga in Napa Valley (California). A card sorting task was devised to test the development of the children's graphic sense. Data were also collected on the children's socialization to literacy, reading readiness and achievement, and oral language proficiency. The data and results of analyses are discussed at length. It was found that: (1) graphic sense is developed by all children, (2) the level of graphic sense is strongly related to the nature of a child's exposure to written language at home, and (3) there is no demonstrated relationship between graphic sense and readiness for school. (AMH)

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The Study of Graphic Sense and Its Effects on the Acquisition of Literacy

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Instituto de Lengua Y Cultura

FINAL REPORT

U.S. DEPARTMENT OF EDUCATION
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The authors owe a debt of gratitude to many people for the conduct and completion of this research. Majorie Martus of the Ford Foundation was instrumental in putting us in contact with a number of persons doing similar work in this field. Throughout this report we acknowledge the great influence on our own thinking that the work of Emilia Ferreiro has had. We have profited much from discussions with Barbara Merino, George Yonge, and Richard Figueroa of U.C. Davis and with Mary Spencer of Americas Behavioral Research Corporation of San Francisco. Billy Watts of Calistoga Elementary School afforded the project his full cooperation and many resources for which we are grateful. The work would have been impossible to complete without the time and effort of several research assistants including Trudy Angell, Marisa Hawks, Marta Kreiden, Ana Rivas, Benita Civitello, and Dale Duerod. Finally, the services of our secretary Ms. Elvia Nava were of critical importance in the smooth operation of the project and in the production of this research report.

E.H.Ch.
J.K.C.

Katie , a six-year-old first-grader from a lower-middle class Anglo-American home, had decided that the following graphic representation was not "for reading", but rather "just for looking at":

When asked why she had rejected that particular card, Katie replied,

"You can't read firecrackers!!"

INTRODUCTION

The report describes a study on the development of children's conceptualizations of written language, i.e. their graphic sense. This study was funded under a contract with Inter America Research Associates as part of a larger project on the assessment of language proficiencies.

Ferreiro (1978) has found that children who have not yet learned to read, nevertheless have very clear notions about what is represented in written text. Moreover, these notions are acquired developmentally in a similar manner by all normal children given particular conditions of socialization to print. This study investigated this development among Mexican-American and Anglo-American children in a rural setting in northern California.

In addition, the relationship between graphic sense and specific conditions of socialization to print in the pre-school experience of these children is examined. The nature of this socialization is studied in terms of its possible effects on the development of graphic sense.

The study will also investigates the relationship of graphic sense to reading readiness. This investigation will propose an explanation of the acquisition of

literacy which is qualitatively different from that of current readiness theories.

The research attempts to answer the following questions:

1. Is the acquisition of literacy a developmental process? Do the responses given by Spanish dominant and English dominant children reveal similar stages of reasoning (i.e., does the process appear to be a general one, followed by children from different cultural groups and social backgrounds)?
2. Do the "levels" of graphic sense tend to be associated with particular "sociographic" background variables: literacy of family members, presence of reading and writing materials in the home, and social literacy experiences in the home? If shown to exist, is the relationship between these variables and the development of graphic sense different for Spanish dominant and English dominant children?
3. Can a relationship be demonstrated between graphic sense level and performance on traditional measures of readiness and achievement?

CHAPTER I. BACKGROUND AND RATIONALE

The problems facing language minority students in the public schools in the United States are well documented. The Coleman Report (DHEW, 1966) demonstrates that, by the 12th grade, the average Mexican-American student is 3.5 years behind the national norm in verbal ability and 3.3 years behind in reading. The problem is even more serious than these figures show. Retardation in reading among Mexican-American children becomes evident from the beginning of their acquisition of literacy (U.S. Commission on Civil Rights, 1971). Some of this retardation is due directly to attempts to teach children to read in English before they are ready although bilingual instruction is now alleviating this problem to some extent.

Critically important to this problem are the explanations that have been offered for the difficulties encountered by linguistic minority children in learning to read. Group differences in academic achievement have been related to race, ethnicity, and SES (Mayeske et al., 1972; Bruner, 1971; Corbin and Crosby, 1965). In addition, sociocultural variables, most notably those dealing with child-rearing and socialization practices and with family and community attitudes toward literacy, have been examined (Ramirez and Castaneda, 1974; Cole and Bruner, 1972; Wolf, 1965; Lloyd, 1964).

Out of these kinds of studies has come the model of cultural deprivation for reading readiness. Deficiencies in the child's sensory environment, according

to this model, lead to linguistic, conceptual, and perceptual deficits in the child which inhibit his or her ability to learn to read. The theory underlying the emphasis upon the development of these skills in compensatory education programs is that "cultural deprivation" accounts for measurable deficits in these areas.

Tests of reading readiness reinforce the assumptions behind these studies. Typically, these kinds of tests measure auditory and visual perception and memory, spatial and relational concepts, vocabulary, and motor coordination. There is no question that all these skills enter into the reading process in some way. However, the assumption is that if the child is not ready to read, as measured by these tests, or if he or she has difficulty in learning to read, the child must have a deficit in one or more of these skills.

Available tests of reading readiness are simply not appropriate for language minority children. Direct translations of assessment instruments are of questionable validity and cultural relevance. A more important shortcoming of readiness tests is that the skills measured are not sufficiently isolated. For example, visual discrimination of letters is distinct from visual discrimination of non-verbal symbols. A child who can distinguish a diamond from a triangle may not be able to discriminate between a t and an l. Yet the measurement of these separate skills is typically combined on single readiness subtests. A child with limited exposure to print may therefore be erroneously diagnosed as having a perceptual deficit in the area of visual discrimination. Furthermore, readiness instruction in this area frequently proposes to develop perceptual skills by means of non-verbal stimuli. For example, visual sequential memory

is "taught" through the experience of stringing beads of varying sizes, shapes and colors to match a sequence prepared and presented by the teacher. Similarly, auditory discrimination is developed through the presentation of musical tones varying in pitch, and the requirement to recognize similarity or difference.

Also in the testing of language and conceptual development, cultural bias, e.g. pictorial stimuli including culturally unfamiliar objects or events, may result in inaccurate assessment of a child's developmental level.

Vocabulary development is included as a readiness skill according to the theory that the child cannot be taught to read a word for which he or she has no referent in meaning. The notion here is that "deprived" children are impoverished in their knowledge of words and their referents.

We cannot accept these notions. Without disputing the importance of oral language development and perceptual skills to the reading process, we believe that a child's failure to learn to read does not necessarily indicate deficiencies in these areas. We see no reason to think, for example, that a migrant child - whatever his or her experiences - should fail to develop normally with respect to such abilities as discriminating a bell from a buzzer or understanding the concepts "below" or "as many". Rather, it may be the case that assessment techniques which provide for adequate and accurate measurement of readiness skills have yet to be developed.

Recent theoretical work suggests that the acquisition of literacy, like the

acquisition of oral language, is a developmental process. From this point of view, reading readiness may be seen as a stage in the process at which every normal child will arrive given certain conditions of exposure to and interaction with written language.

Several observers have noted that the acquisition of literacy involves an active and creative process on the part of the learner, even without formal instruction. Paolo Freire (1970) considered literacy to be "born of the creative effort of the learner." Carol Chomsky (1971) believes that "children should learn to read by creating their own spellings for familiar words as a beginning." Gibson (1970) wonders why reading doesn't "just grow, like language."

A number of investigators have commented on the metalinguistic awareness of young children. For example, several studies have found that children's concepts of "sentence", "word", and "sound" in oral language are quite unlike those of adults (e.g. Huttenlocher 1964, Reid 1966, Downing 1969). Children have great difficulty in distinguishing these notions and hold unconventional concepts of what they are. Other studies have looked at children's concepts of words and sounds and their relationship to the conventions of print. Read (1971) studied the acquisition of phonology in the pre-school and kindergarten children of academic professional parents. He used the children's invented spellings as evidence for their implicit phonological organization. Some of his subjects began inventing spellings as early as age 3½. He found striking evidence that the apparently strange spellings employed underlying phonetic relationships of backness, nasality, syllabicity, height, and affrication. For

example, "i" represented both (ay) and (a), and "e" was used for both (iy) and (i); similarly "ch" and "j" were used to represent the affrication in words like try and dry.

On a somewhat different tack, Gibson (1970) reports on a number of experiments in which it was found that seven-year-old children used the features of diagonality, roundness, and squareness not only to distinguish letters, but to organize them hierarchically.

As is the case with speech, young children have great difficulty in understanding the notion "word" in written language. A general indication of this difficulty is children's inattention to the spaces in conventional writing (Hochberg 1970, Metzer and Herse 1969, Goodman 1969). Metzer and Herse (1969) found that 1st grade children not only confused letter and word, they used the length of words and the height of letters to distinguish "word" boundaries. Reid's (1966) study showed also that 1st grade children cannot easily distinguish numbers from either letters or words.

Children's recognition of writing and its functions is another area that has drawn the attention of some investigators. Gibson (1970), for example, reports on research with 3-4 year olds in two nursery schools - one a cooperative nursery serving lower SES families, the other the Cornell nursery whose pupils were children of university students and professionals. Most of the three-year-old children were able to distinguish writing from pictures. Also, the four-year-olds in the Cornell nursery were able to distinguish scribbling from letters but those in the cooperative nursery were not. Kindergarten children

were also tested, and in the high SES groups, most could distinguish scribbling from cursive writing and even from artificial and foreign scripts. (The assumption is that these differences were attributable to SES. However, the possibility of differential treatment in the two schools should not be overlooked.) Downing (1969) also worked in this area but found that many five-year-old children confused writing with pictures. Some indicated that individual letters or even parts of letters represented objects. This was true even though many could call the letter names. Downing's subjects also were aware of the labeling function of letters and numbers. However, like Reid's (1966) subjects, they showed only a vague awareness of what reading is like, what it consists of, and what it might be used for.

Recent research in Mexico, Argentina and Switzerland carries these notions forward in an important way. In this work, Ferreiro (1976, 1978) has found that young children undergo a process of development in their conceptualization of the nature of written language. She proposes that the acquisition of children's ideas about writing is a cognitive process similar in nature to the Piagetian conceptual development by which the child reconstructs the basic categories of logical thought in order to arrive at an understanding of the real world.

Ferreiro defines specific levels of conceptualization of print each of which is characterized by particular types of correspondences between the oral and written forms. For example, among the earliest notions about what may be represented in writing is a vague distinction between a text and a drawing. Only the referential content of the message, rather than its linguistic form, is

represented. The child focuses on the meaning of the utterance as a whole which may be represented by any or all segments of a text.

In later development, the child perceives that a text may represent subjects and objects but no verb. The concept of a written verb emerges only later. Similarly, articles are not language elements that are thought to be part of a written utterance until very late in the developmental process. Children at the most advanced stages of development begin to be aware of the phonological divisions possible within individual words, and the correspondence between these word segments and spoken syllables. The alphabetic principle, i.e. that single letters can represent speech sounds, theoretically will not make sense to the child who has not progressed naturally through the preceding stages of reasoning.

If this developmental theory is accepted, then reading and readiness instruction which focuses upon phonic synthesis (e.g., /b/ + /e/ + /d/ = 'bed', or /l/ + /u/ + /n/ + /a/ = 'luna') can be seen as totally inappropriate for a child who is at such an early developmental stage that the awareness of the segmentation of words in print has barely been mastered. Nonetheless, these techniques are widely employed in the public schools, beginning at the kindergarten level. The children who cannot make sense of this phonics puzzle are often simply retained and given the same lessons again and again, until they appear to have learned how to use the code. A concern is that these children do learn (instead or in addition) that reading is a silly game that has little to do with communication. These may be the "problem readers" of the intermediate grades, whose decoding skills are adequate, but have no comprehension of what

they read.

It is hypothesized that success in learning to read will depend on the level of this graphic development in the child. Further hypothesized is the close relationship between the rate of this development and the quality of the child's socialization experiences. These hypotheses are supported by Ferreiro's work as well as that of other investigators. Chomsky (1972), in studying the development of advanced grammatical structures in children's speech, also noted the relationship of the amount and complexity of what children read to their level of linguistic devlopment as well as to IQ and SES. Using measures of knowledge of well-known stories, number of books used, reading habits, library trips, time that adults spent reading to the child, etc., she found a positive and significant correlation between these variables and the development of linguistic competence.

Reading exposure has also been found to have a positive correlation to academic achievement. In a longitudinal study of Mexican and Mexican American children, Holtzman et al. (1975) looked at parental background and the presence and nature of reading material in the home. They found a strong relationship between these variables and reading achievement. Similar results were found by Thorndike (1973) in a study of several European, Asian, and South American countries. In a ten-year longitudinal study in Bristol, Wells (1978) found that the level of attainment in literacy by seven-year-olds was related to the extent to which they had been read to by their parents during the preschool years. What all of these studies show is that children have experiences with written language long before they enter school and begin

formal instruction. From these experiences, they begin to acquire notions about print. The quality of the pre-literacy experiences seems to be reflected in the kinds of conceptualizations that children acquire.

Thus, we can see that, in addition to those skills generally believed to comprise reading readiness, e.g. linguistic and perceptual development, we must now take into account the notion of conceptualization of print or graphic sense. Indeed, graphic sense may encompass these other abilities.

In order to understand fully the process of literacy acquisition, it is necessary to study the relationship of graphic sense to reading socialization and to reading readiness. This will permit both the development of more adequate assessment and the design of more effective instructional practices.

Group differences in readiness for reading instruction, formerly attributed to cultural "disadvantage", may be found to be clearly related to group differences in socialization practice, specifically the extent of the child's interaction with written language in the preshool years. The developmental model will provide for innovation in instructional strategy which responds to the learner's level of graphic sense. Readiness instruction which engages the learner in meaningful interaction with written language may be found more sensible than the traditional focus upon beads and bells, and the untimely introduction to phonics.

CHAPTER II. METHODOLOGY

The Sample

Included in the study were all the children from the bilingual kindergarten and first grades of Calistoga Elementary School, located in the Northern end of California's Napa Valley. In addition, the sample included 43 pre-school age children from the school attendance area . These children were selected from the families of the school sample in order to match as closely as possible the characteristics of that sample. The total sample was 114 children, with the breakdown by grade level and language dominance represented in Table 1.

Only five children, two Kindergartners and three first graders could be classified "balanced bilingual." This classification, based upon a comparison of scores on the Bilingual Syntax Measure in English and Spanish, implies that the child utilizes comparable grammatical structures in the two languages. A higher level on either version would indicate dominance of that language over the other. Because so few children obtained equal scores on the two versions, it was not possible to test for the effects of bilingualism upon the development of graphic sense. This may be an important area for future study.

Procedures

In order to address the research questions regarding the relationship between graphic sense and sociographic background factors on the one hand and between graphic sense and academic performance on the other, data were

TABLE 1 DISTRIBUTION OF THE SAMPLE BY GRADE AND DOMINANCE

	Spanish Dominant	Balanced Bilingual	English Dominant	Totals
Preschool	17	0	26	43
Kindergarten	23	2	13	38
First Grade	12	3	18	33
Totals	52	5	57	114

gathered on socialization to literacy, reading readiness and achievement, and oral language proficiency. The methods for collecting these data are described below. First, the graphic sense measures are discussed in detail, including the design of the instruments, the procedures for their administration, and reliability data. Then, the Graphic Sense Structure Location Task is presented, with a discussion of its development and administration. Finally, the instruments used for the collection of other data are described.

With the exception of the oral language proficiency assessment (which was administered to all subjects in both English and Spanish), testing was conducted in the child's dominant language. Achievement was tested only in the language of reading instruction. Most of the testing was conducted during the week of Spring vacation, April 13 through 18, 1981. This schedule was chosen for two reasons. The research assistants are all school employees and were available. More importantly, since many of the skills measured are (or are assumed to be) developmental, it was desirable to collect all of the various data during a relatively short period of time. Since the language and achievement data are regularly collected by the school in early May, it was possible to arrange for the coincidence of test administration.

Development of the Graphic Sense Card Sorting Task (GS-1). In the development of graphic sense, children acquire conceptualizations about what can and cannot be read. In different stages of this development, children use different criteria for accepting or rejecting particular graphic representations as readable. Children's use of these criteria reveals the underlying ideas they have about the nature of written language.

In order to discover these criteria, a card sorting task was devised. Based upon hypotheses about the features of graphic representation to which children will respond, two sets of cards were designed, one in English and one in Spanish. In turn, each set consisted of two identical decks of thirty-four cards each. The cards vary along the following dimensions: pictorial representation, script, segmentation, linearity, letter orientation, letter order, numericity, foreign language, repetition of elements, length of string, and linguistic reality.

Variation along several of these dimensions was suggested by the work done in Argentina and Mexico by Ferreiro (1976, 1978). In a procedure similar to the Graphic Sense Card Sorting Task, Ferreiro's subjects were presented a deck of twenty cards, varying in length of string, repetition of letters, script (including cursive and pseudo-letters), and between capitals and lower case letters. She also used cards with isolated and "compound" numbers. Through other procedures, she found that children attended to the order of letters and the distinction between letters and punctuation marks.

Other investigators have discussed children's ability to discriminate between writing and pictures (Gibson 1970, Downing 1969). Also noted in Gibson's findings was the distinction between scribbling and manuscript letters, cursive writing, and artificial and foreign scripts.

GS-1 includes items designed to assess children's notions about the importance of each of the above variables. In addition, classroom experience in the primary grades has raised questions regarding the extent to which children

attend to such characteristics of written language as segmentation between words, linear orientation of a string, and letter orientation (inversions, reversals, and rotations). Typically, young children ignore these features in their writing. In order to discover if (and at what point) these conventions become meaningful, several items were designed.

Two other types of variation are included in an attempt to distinguish among higher levels of graphic sense. Developmentally advanced first graders, especially those with bilingual classroom experience, may be aware that languages other than their own can nonetheless be read. To test this awareness, five items were included, each of which consisted of a word in a foreign language. Three of these (Chinese, Russian, and Arabic) were written in a non-Roman script. In addition, several items were included which were either semantically nonsensical (i.e. can be decoded, but have no meaning) or phonologically inadmissible (having phonic sequences which do not occur in the child's language).

Reproductions of the stimuli used in the Spanish and English versions of GS-1 are presented on the next two pages in Figures 1 and 2, respectively. On each version, Card 1 represents the base word from which many of the other items vary. For example, Cards 6, 16, and 23 vary from the base word according to linear orientation of the string. On Card 6, the four letters of the base word are written in a circular configuration; on Card 16, the word is written vertically from top to bottom; and on Card 23, it is written in an arc. This

Card	Stimulus	Card	Stimulus
1.	luna	18.	n
2.		19.	vuna
3.	m n mn	20.	ПУНА
4.	LUNA	21.	lnua
5.	en la luna	22.	EOJb
6.		23.	
7.		24.	aaaa
8.	4	25.	5348
9.	sand	26.	un
10.		27.	Luna
11.	luna	28.	l⊧⊏v
12.	E	29.	anul
13.	enlaluna	30.	
14.	una	31.	nnnn
15.		32.	en laluna
16.		33.	lune
17.	mmmm	34.	a

FIGURE 1. Graphic Sense Card Sorting Task, Spanish Version.

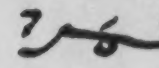
Card	Stimulus	Card	Stimulus
1.	sand	18.	d
2.		19.	vand
3.	m n mn	20.	ПУНА
4.	SAND	21.	sdna
5.	in the sand	22.	EOCδ
6.	s a n d	23.	s a n d
7.	bnsz	24.	aaaa
8.	4	25.	5348
9.	luna	26.	an
10.	@+!★	27.	SOND
11.	sand	28.	s»≠P
12.	E	29.	dnas
13.	inthesand	30.	
14.	and	31.	dddd
15.		32.	in thesand
16.		33.	lune
17.	mmmm	34.	a

FIGURE 2. Graphic Sense Card Sorting Task, English Version.

type of variation from the base word was used to isolate each of the relevant criteria in the child's reasoning toward acceptance or rejection of a given stimulus and to avoid confounding the dimensions according to which the choices were made. Cards 4, 11, and 27 vary from the base along the dimension of script. On these cards the base word is written in capital manuscript, lower-case cursive and capital cursive letters, respectively.

Other items vary along other dimensions. Item 7 is the mirror image of the base word, and three of the letters in item 28 are rotated on their axes (letter orientation). Cards 34, 26 and 14 consist of words with one, two and three letters, respectively; Card 18 presents a single consonant, taken from the base word (length of string). Card 24 has four of the same vowel, and Card 31 has four of the same consonant (repetition of elements). Cards 5, 13 and 32 present the base word in a three-word phrase, with correct spacing, no spacing, and incorrect spacing (segmentation). On Card 19 the initial consonant of the base word is replaced by another which makes the stimulus word semantically nonsensical. On Card 21 the letters of the base word are rearranged in a phonologically inadmissable order. Card 29 presents the baseword, with the letters written in reverse order.

The particular base word for each version was chosen for a number of reasons. Because of Ferreiro's finding (1976) that to be acceptable to four-year-olds, a word must have at least three letters, a four-letter base word was chosen to avoid confusion in attention to other dimensions. Additionally, words were selected in which smaller words were embedded. In the English version, the word sand contains the words and, an, and a. Similarly, the word luna contains

the words una, un, and a. The items present variations in length of string. Also, it was important that the words be of approximately the same order of difficulty in each of the languages. In English, words of the linguistic structure CVCC are considered decodable at the first grade level. In Spanish, on the other hand, disyllabic words of the structure CVCV are decodable at the same grade level.

The remaining items were designed to reflect other distinctions or combinations of distinctions. Cards 3 and 17 represent variation of script (scribble) and of segmentation or length of string. Card 2, a drawing of a flower, was included after the base word to orient the child to the task and to test the distinction between pictures and graphic symbols. Card 8, a single digit, and Card 25, a four-digit number were designed to assess the child's notions about the relationship between numbers and reading. The purpose for including Cards 10, 12, and 22 was to measure the reactions to fictitious scripts, Cards 12 and 22 combining the variable of length of string. Cards 15, 20 and 30 intend the measurement of reactions to actual foreign scripts. Cards 33 and 9 represent foreign languages written in Roman script.

Administration of GS-1. The two identical decks of cards were presented to each child individually, using the set of decks corresponding to the child's dominant language. The child was asked to place all those cards that "are for reading" in one stack and all the cards that "are just for looking at" in a separate stack. Care was taken to insure that the children did not think that they had to be able to read a card to put it in the "for reading" stack. "For reading" was defined to mean, "something that a grown-up could read, like

your teacher or your mother or father." Directions for Administering Graphic Sense Card Sorting Task are included in Appendix A. After the child had sorted all the cards in both decks into two stacks, he or she was asked to explain a general difference between the two stacks. Then, the reasons for rejecting each of the cards in the stack called "just for looking at" were elicited. The examiner wrote the child's responses verbatim onto the test protocol. Copies of the protocols can be found in Appendix B.

Development of Graphic Sense Structure Location Task (GS-2). Another indication of what we believe will characterize stages in the development of graphic sense are the child's notions about how much and which portions of a spoken utterance will be represented in a text. Ferreiro's findings (1978) suggested that children at an early stage would accept that only the referential content of an utterance would be located in its written counterpart. Advanced levels of reasoning, on the other hand, ultimately permit children to identify each spoken word as segmented in the written string.

In order to examine these notions, a second task was devised. Two cards were designed on each of which was printed a cartoon drawing of a kitten and a corresponding sentence under the picture. In Ferreiro's study, the child's attention was focused on a sentence which the examiner wrote down in the child's presence. The child was then asked to locate the various structures within the string. The two sentences used were Papa patea la pelota, and Carmen compro un caramelo. It was unclear whether all the subjects discussed both sentences or if one was presented to some subjects and the second to others.

The Graphic Sense Structure Location Task differs in two important ways from the stimuli used in Ferreiro's work. First, the children were given pictorial stimuli which provided a context within which to discuss the written sentence. Reproductions of the drawings and stimulus sentences in Spanish and English are presented in Appendix C. The content was carefully selected in order to minimize, to the extent possible, the use of culturally unfamiliar material for either the Spanish- or English- speaking children.

A second difference concerns the linguistic complexity of the stimuli. Both of Ferreiro's sentences were simple transitives of the type SVO. GS-2 also includes a sentence of the SVO type. In addition, a somewhat more complex intransitive sentence was used. It was hypothesized that the children would respond differentially to structures of varying complexity whether or not they were able to decode. Thus, a prepositional phrase was used together with a syntactically and semantically complex intransitive verb. Special effort was taken to select sentences for both structures that would be of similar complexity in each language. This was not altogether possible and may be impossible in principle. See the discussion on this point in Chapter V.

Administration of GS-2. The picture cards were presented to each child individually, and the testing sessions were taped recorded. It was our purpose on this task to gain a more general understanding of the children's conceptualization than with the card sorting task. For this reason, the testing was conducted according to a more open-ended format. The questions were asked in a conversational tone, they were repeated or reworded when necessary, and probes were made where it was appropriate.

All of the testing was done by the two principal investigators, one of whom is a native speaker of Spanish and the other a native speaker of English. When they were presented with Picture A, the children's attention was first focused on the drawing. They were told, "Look what happened in the picture. The kitten broke the cup," and in Spanish "Mira lo que pasó en el retrato. El gatito quebró la taza." Then the child was asked to tell what happened in the picture and the response was written down on the protocol. This was done so that the child would focus on the stimulus sentence. (See examples of the test protocols in Appendix D.) Next, the focus was shifted to the written sentence. The children were told, "Now look at this. This tells about the picture. What do you think it says." All of the child's responses are recorded verbatim.

If the child said something like "I can't read" or "I don't know," the examiner encouraged her/him to guess at what it said given the previous response to the picture itself and the assurance that the text "tells" about the picture. for example, the child would be told, "You don't have to read it. You said before that the picture shows that 'the kitten broke the cup,' and we know that this (the text) tells about the picture. So what do you think it says."

The child's own production was written exactly as it was said. From this, the examiner then proceeded to ask the child if the various syntactic components of the sentence were present in the form written under the picture. If the child answered affirmatively, he or she was asked to locate it: "Where does it say that?" The examiner continued in this manner for all the major and minor grammatical structures in the child's own utterance. Finally, if the child's own utterance was different from the actual sentence as written, the examiner

asked about the location of the grammatical elements of the latter. This was done in order to have a uniform basis of comparison across all the children. The order in which these were presented was (1) object noun phrase, (2) the predicate, (3) subject noun phrase, (4) the verb, and (5) the article. (In Spanish, since the articles were different, both articles were presented.

Picture B was presented in the same manner. The order of presentation, however, was necessarily different: (1) the V (fell asleep and se durmió), (2) the verb complement (asleep) for English and the verb (durmió) for Spanish, (3) the verb (fell) and the reflexive pronoun (se), (4) the subject noun phrase, (5) the subject noun, (6) the subject noun phrase article, (7) the verb phrase, (8) the prepositional phrase, (9) the object phrase, (10) the object noun, (11) the object noun article, and (12) the preposition.

In addition to recording the child's location of each segment, special notation was made of other relevant responses such as pointing in a left to right or right to left direction, pointing at the picture, or verbal responses.

Reliability of the Instruments

It was not the primary purpose of this study to develop valid and reliable instruments to be used in the identification of graphic sense levels for individual children. Rather, the intention has been to understand the particular stages in the development. For this reason, procedures to demonstrate the reliability of the instruments over time were not undertaken. However, the following reliability procedures were performed.

Graphic Sense Card Sorting Task. For GS-1, a comparison of the response patterns between the two decks within each set provides a measure of "response consistency." This is, in a sense, an immediate test-retest reliability measure. Table 2 demonstrates for each six-month age group the mean number of identical reactions to matched cards in the two decks. The percentage of the total number of items represented by each mean is also indicated. These means are further divided by language dominance, and then combined across each of the language groups. Because of the extremely small number of cases in some of the cells, the information provided about any single age group cannot be interpreted meaningfully. Standard deviations are included to indicate the degree of variance within each group. Nevertheless, the general pattern is interesting, and the combined means reveal a moderate degree of consistency in the children's reactions to the items.

In an attempt to test for inter-scorer reliability, audio-recordings were made of the administration of the GS-1 to a subsample of 27 children. The purpose was to compare the original protocol with a second which would be filled out by a different examiner. However, it was discovered that, due to the non-verbal nature of the sorting response, it was not possible to tell from the tape alone for which card a particular reason was being given. Means by which this problem could be resolved are speaking the item numbers onto the audio-tape, video-taping the sessions, or simultaneous scoring of the responses by two examiners.

TABLE 2 CONSISTENCY OF REACTION TO MATCHED CARDS IN THE TWO DECKS OF THE GRAPHIC SENSE CARD SORTING TASK

	Spanish Dominant				English Dominant			
Age Group	N	$\bar{X}$	SD	%	N	$\bar{X}$	SD	%
4;0 - 4;5	8	33.50	1.00	99	4	32.25	3.03	95
4;6 - 4;11	6	32.00	1.41	94	11	29.45	4.76	87
5;0 - 5;5	5	31.60	2.06	93	15	31.53	2.17	93
5;6 - 5;11	12	31.00	4.65	91	6	30.17	2.37	89
6;0 - 6;5	3	28.33	5.26	83	6	31.17	2.95	92
6;6 - 6;11	10	32.30	2.45	95	11	31.27	2.30	92
7;0 - 7;5	6	32.33	1.76	95	4	30.75	2.05	90
7;6 - 7;11	2	33.50	.50	99	2	33.00	1.00	97
8;0 - 8;5	5	32.00	2.19	94	0			
8.6 - 8;11	1	30.00	0	88				
Total	58	31.84	-	93	59	30.96	-	92

Graphic Sense Structure Location Task. GS-2 was composed of two sub-tasks - Picture A and Picture B - with differing sentence complexity. In the same way as with the card sorting task, the response patterns between the two pictures provides a measure of response consistency. The responses were analyzed separately for each sub-task and a graphic sense level assigned to each student. Since the ordering of the response features on each of the sub-tasks was so similar, it was possible to combine the scores into a single GS-2 level.

Tables 3-4 provide the correlation coefficients for the comparison of the levels for Picture A and Picture B, and for each of these with the combined GS-2 levels. Of most relevance for this discussion are the correlations between Pictures A and B. For the Spanish version the correlation is quite high, as the table shows, and is extremely high for the English version. Both correlations are at high levels of significance. They indicate strongly that there was a substantial amount of consistency in the children's responses to the items on the two sub-tasks.

Rigorous training sessions attempted to provide for inter-examiner reliability. For the English dominant sample, a single examiner administered each of the tasks to all subjects. For the Spanish dominant group, two examiners administered the tasks. Immediately preceding and throughout the testing period, the three examiners worked very closely together to insure standardization of procedures.

TABLE 3 CORRELATIONS BETWEEN GRAPHIC SENSE LEVELS FROM PICTURES A AND B AND OVERALL GSII LEVELS FOR SPANISH DOMINANT CHILDREN

	PICTURE A	PICTURE B	OVERALL GSII
PICTURE A		.63*	.87*
PICTURE B			.75*
$\bar{X}$	1.33	1.82	1.66
SD	1.06	.98	.94

*p<.001

TABLE 4 CORRELATIONS BETWEEN GRAPHIC SENSE LEVELS FROM PICTURES A AND B AND OVERALL GSII LEVELS FOR ENGLISH DOMINANT CHILDREN

	PICTURE A	PICTURE B	OVERALL GSII
PICTURE A		.87*	.96*
PICTURE B			.97*
$\bar{X}$	2.72	2.63	2.67
SD	1.66	1.63	1.59

*p<.001

Collection of Other Data

Socialization to Literacy Data. These data include the amount and nature of reading and writing by family members. This is hypothesized to play a central role in the development of the child's graphic sense. The quality of the reading and writing activity engaged in by family members themselves defines the functions that literacy has in the family and will play a strong role in the significance that the child attributes to reading.

A "sociographic" questionnaire was developed and piloted. Video-tapes of pilot interviews were used for initial training of the interviewers. After several training sessions utilizing role-playing, feedback and discussion, each of the staff conducted three interviews with parents of children who were not participants in the study, but who fell within the same age range. Copies of the interview schedules are to be found in Appendix E. The instrument includes questions about family structure, residence history, educational history of family members and employment of family members. Other areas covered are the child's language development, attitudes of the parents toward the relative value of proficiency in Spanish and English, and the parents' educational and career aspirations for the child. Language use patterns in and outside the home comprise another set of questions. Finally, a section on literacy inquires into the kinds of reading materials available, who uses them with what frequency and when. It also asks about the children's exposure and reactions to printed media of various sorts.

For the purposes of the present study, the following twelve variables have

been selected for consideration: mother's years of schooling, father's years of schooling, mother's level of literacy, father's level of literacy, reading and/or writing activity engaged in by mother, reading and/or writing activity engaged in by father, reading and/or writing activity engaged in by the focus child, social reading and/or writing activity in the home, dyadic reading and/or writing activity with the focus child, the quantity of children's books present in the home, the quantity of magazines present in the home, and the quantity of writing materials present in the home. Audio-recordings were made of the interviews, and the information was subsequently transferred onto data summary forms (Appendix F).

Reading Readiness and Achievement Data. On the preschool sample, these data were collected by means of the Cooperative Preschool Inventory (1970, 1974). Although it would be inaccurate to call the CPI a test of reading readiness, it purports to be a measure of general readiness for school entry. For the kindergarten sample, these data were collected by means of the Slingerland Pre-Reading Screening Procedures (1969). This instrument has been adapted by the Calistoga School District for administration in English and Spanish. It has not been standardized nationally, but the district has developed local norms in both languages. When administered in September to entering first graders, it has been found by the district to be highly predictive of reading readiness and initial reading success. For children in Grade 1, scores from the reading sub-tests of the Comprehensive Test of Basic Skills (1974, 1978) were used to measure achievement. Both of these kinds of data are regularly gathered by the School District and were available to the project.

Oral Language Proficiency Data. Oral language proficiency assessment is regularly conducted by school personnel on the students in whose homes a language other than English is spoken. Proficiency in English and Spanish is measured by use of the Bilingual Syntax Measure (BSM) (1975). The school staff member trained in the administration of the BSM was as well employed as a research assistant for this study. This test was administered to all subjects in both languages. The BSM claims to measure developmental stages in the acquisition of grammatical structures in both English and Spanish. In spite of criticism often directed at this instrument regarding the minimal number of items, difficulty of scoring, and method of administration, it was chosen for use because it does tend to discriminate among several levels of proficiency related to age. Moreover, all other available instruments for the assessment of language proficiency have equally serious limitations.

CHAPTER III. RESULTS

In this chapter, each of the three research questions will be addressed by a section in which statistical data are presented and explained. First, procedures undertaken to obtain profiles of responses typical of each stage in the development of graphic sense are described. Analysis of the children's responses to the GS-1 and GS-2 tasks provides evidence in support of the hypothesis that the acquisition of literacy is a developmental process. Data will also be presented which demonstrate that Spanish dominant and English dominant children in Calistoga pass through similar stages of reasoning.

The second section presents evidence concerning the relationship between selected sociographic background factors and the levels of graphic sense. Differences in this relationship between the Spanish dominant and English dominant subsamples are demonstrated by means of multiple correlation coefficients and corresponding sets of beta weights.

The final section looks at the relationships between graphic sense level and performance on traditional measures of readiness and achievement. Data is also presented which relates graphic sense to oral language proficiency.

Group Differences

Prior to reporting the evidence which addresses the research questions themselves, it will be necessary to examine the differences between the

language dominance groups on the twelve sociographic variables. This discussion will provide a rationale for the separate analysis and comparison of data from the these two groups. Given the very different sociocultural background and experience of the different language groups within the sample, differences in central tendency and variability among a number of important factors were expected. For this reason and for the reason that school achievement or readiness had necessarily to be measured by different instruments at the three grade levels, combining data from the different groups for many statistical analyses would be inappropriate. The extent of these differences is summarized in Table 5.

The variables under consideration here are the same twelve sociographic factors which were selected for inclusion in the multiple regression study. Because of unequal n's, the assumption of equal variances was tested by subjecting the means and standard deviations of each group on these variables to an F test. In the three cases where the F value proved significant, i.e. Father Reads or Writes, Quantity of Children's Books, and Quantity of Writing Materials, calculation of the corresponding t values was based upon separate variance estimates. In all other cases, in which the probability of F is less than .01, calculation of the corresponding t values was based upon pooled variance estimates.

The expectations regarding the differences between the language groups are strongly supported by the high levels of significance represented in Table 5. It is interesting to note that values of 0 were obtained for the standard deviation and F on the variables Mother Reads or Writes, Social Reading or Writing, and

TABLE 5 MEANS, STANDARD DEVIATIONS, AND RESULTS OF THE TESTS OF SIGNIFICANCE BETWEEN THE MEANS OBTAINED ON SELECTED SOCIOGRAPHIC VARIABLES BY SPANISH DOMINANT AND ENGLISH DOMINANT SUBJECTS

	SPANISH DOMINANT		ENGLISH DOMINANT			
Variable	$\bar{X}$	SD	$\bar{X}$	SD	F	t
Mother's Years of School	4.16	3.31	13.96	2.90	1.30	-16.40***
Father's Years of School	4.14	3.37	14.09	3.00	1.26	-15.93***
Mother's Level of Literacy	1.50	.80	2.54	.60	1.80	- 7.72***
Father's Level of Literacy	1.60	.67	2.40	.66	1.05	- 6.18***
Mother Reads or Writes	.85	.36	1.00	0	0	- 3.19**
Father Reads or Writes	.82	.39	.96	.14	8.28**	- 2.80**
Focus Child Reads or Writes	.67	.47	.86	.35	1.83	- 2.35*
Social Reading or Writing	.87	.34	1.00	0	0	- 2.95**
Dyadic Reading or Writing	.85	.36	1.00	0	- 0	- 3.19**
Quantity of Children's Books	1.10	.77	3.89	1.28	2.73**	-13.97***
Quantity of Magazines	.85	.78	2.95	1.09	1.98	-11.47***
Quantity of Writing Materials	1.98	.70	2.88	.33	4.47**	- 8.42***

* $p < .05$
** $p < .01$
*** $p < .001$

Dyadic Reading or Writing in the English dominant sample. 100% of the respondents within this language group answered these questions affirmatively.

Graphic Sense Profiles

Qualitative as well as quantitative techniques of analysis were used with the graphic sense data. On each of the major tasks - the Graphic Sense Card Sorting Tasks (GS-1) and the Graphic Sense Structure Location Task (GS-2) - the responses were qualitative in nature. The extraction of patterns, then, required the classification of responses and the determination of characteristic profiles of response types for each age and linguistic group. This provided the means to assign levels of graphic sense to each child for each task. These levels then enter into a variety of quantitative analyses.

Graphic Sense Card Sorting Task. GS-1 yields two qualitatively different kinds of data: judgments regarding whether or not particular stimuli can be read and, for those stimuli rejected, criteria upon which the decision to reject was based. Analysis of the results must take into account both types of data. Differences in patterns of rejection as well as in patterns of reasons for rejection can be identified across age groups.

The first step in the analysis of the graphic sense data was to list and classify all of the reasons given for the rejection of any of the thirty-four cards in the task. Upon close examination of the protocols, it was found that all of the reasons given in both languages for rejecting any of the thirty-four cards could be fit into twenty-five different "criteria" upon which the rejections were

based. These criteria were inferred from the children's verbatim responses. For example, the response "Es una flor nomás," to the picture on Card 2 implies the use of the same criteria as the response "That's a worm," to the Arabic word on Card 30. From each reason, it can be understood that the child was attending to the pictorial nature of the stimulus, as he or she perceived it.

In several sessions, the principal investigators and one other member of the research team developed the list of criteria presented in Table 6. Criteria were assigned to ten major categories on the basis of qualitative relationships among them. Each was given a code number, indicating the category as well as the specific criterion. Thus, both of the criteria in Category 1 fail to provide any explanation of the child's reasoning. Type 1.1 responses reiterate the rejection, but fail to express the reasoning behind the decision. Similarly, little information is provided when the child rejects a card but claims not to know why (Type 1.2). Figure 3 lists the categories and gives examples of responses within each. The criteria in Category 2 all involve non-symbolic representations such as pictures, designs, or visual "games". In Category 3, children's reasonings focused on the absence of what they considered to be a meaningful symbol. Individual elements in a string were salient in the criteria used in Category 4. Number of elements in the stimuli was the deciding factor for the criteria of Category 5, and in Category 6 it was the distinction between numeric and letter-type symbols. Category 7 involved the ill-formation of letters, words, or scripts, and Categories 8 and 9 involved ill-formation of other sorts, i.e. of linear orientation or of directionality. Finally, Category 10 refers to ill-formedness with respect to segmentation.

TABLE 6 RESPONSE CLASSIFICATIONS FOR GRAPHIC SENSE CARD SORTING TASK

Code	Criterion
1.1	Indeterminate Response
1.2	Don't Know
2.1	Pictorial Representation
2.2	Selecting Individual Pictorial Elements as Meaningful
2.3	Reference to a Design
2.4	Reference to a Game
3.1	Lacks Graphic Symbol
3.2	Meaningless Marks
4.1	Selecting Individual Graphic Symbol as Meaningful
4.2	Unrelated Individual Elements
5.1	Too Few Graphic Symbols
5.2	Too Many Graphic Symbols
5.3	Repetition of Graphic Symbols
5.4	Too Few Pictorial Elements
5.5	Repetition of Pictorial Elements
6.1	Numeric
6.2	Functional Number(s)
7.1	Ill-formed Letters
7.2	Morphophonemically Ill-formed
7.3	Wrong Script
8.1	Wrong Linear Orientation
9.1	Wrong Letter Orientation
9.2	Mirror-Image
9.3	Wrong Order
10.1	Wrong Segmentation

CATEGORY	EXAMPLE RESPONSES
1. No explanation.	Because it's just for looking at. (Card 15) Porque no se puede leer. (Card 17)
2. Non-symbolic represen-representation.	It's tic-tac-toe. (Card 15) Son nubes. (Card 3)
3. Lack of graphic symbol.	It isn't a word. (Card 2) No tiene letras. (Card 10)
4. Individual elements.	There's a snail and a cross and a upside-down i and a star. (Card 10) Tiene una estrella. (Card 10)
5. Number or repetition of elements.	There's just four d's. (Card 31) Tiene nomás una. (Card 34)
6. Numeric.	It's supposed to be my address. (Card 25) Es un cuatro. (Card 8)
7. Ill-formation of symbols.	The j and the i are hooked together. (Card 20) Tiene cuatro líneas. (Card 12)
8. Linear orientation.	Because it goes up and down the way you write Chinese. (Card 16) Porque está así. (gesturing)(Card 23)
9. Letter orientation.	Because they're all mixed-up. (Card 28) La u está al revés. (Card 26)
10. Segmentation.	Because they're all together. (Card 13) No hay espacio. (Card 13)

FIGURE 3. CATEGORIES OF CRITERIA FOR CARD REJECTION AND EXAMPLE RESPONSES

The second step toward describing profiles of responses for each stage of graphic sense was to tally the types of reasons given by children for rejecting each of the 34 cards. These totals were analyzed according to grade level and language dominance group. An attempt was made to combine the variables grade and years in school in order to distinguish between children in a grade who had been retained from those who had not. Ultimately, however, the finer schemes were abandoned because the resulting n's were too small to provide any workable data.

During this analysis, differences became apparent between the language groups in terms of the predominant response to a specific item within a single age group. The most striking example is that the Spanish dominant preschoolers, as a group, accepted all thirty-four items as readable. Sixteen of the cards were accepted by all seventeen subjects in that group. Five cards were accepted by sixteen of the seventeen, and seven more by fifteen children. The remaining six items were accepted by the majority of the group (never fewer than twelve children, or 70%). The English dominant preschoolers, on the other hand, rejected ten of the cards by greater than a 50% margin.

This is not to say that the conceptual development appears dissimilar for children in the two language groups. Actually, the data suggest just the opposite. Kindergartners from the Spanish dominant group make use of the same criteria as do preschoolers from the English dominant sample. In fact, the patterns of response are nearly identical between these two groups. Similarly, the Spanish dominant first graders' responses form a pattern more

like that of the English dominant kindergartners than like that of their English dominant classmates. For example, English dominant preschoolers and Spanish dominant kindergartners accept Card 22 (the string of pseudo-letters) while the English dominant kindergartners and Spanish dominant first graders reject that item on the basis of ill-formation of the symbols (criterion 7.1).

Four distinct patterns of rejection emerged from this analysis. For some cards, children across all three grades and both language groups accepted the graphic representation as readable. On these items, there were no significant differences in response attributable to developmental level. Included in this group were such items as the base word in all capital letters, both items in cursive script, and the correctly segmented string of three words.

A second pattern could be identified in the responses to certain cards for which rejection was always based upon the same criterion. Items of this type could be further divided into two subgroups. For some items, rejection followed a pattern of acceptance by both the youngest and the oldest and were rejected in the middle (e.g., the two letter word and the vertical base word). Other items were overwhelmingly accepted by preschoolers, but then the rate of rejection increased in the higher grade groups (e.g., the mirror image of the base word and the four consonants).

A third pattern was seen on some items which were rejected by all but a very few children (who accepted literally everything as readable) and for which the rejections were based upon the same one or two criteria across grades (e.g., the Chinese character, the flower and the scribbles).

Finally, the fourth type of pattern seemed to discriminate between one type of response at the lower grade level(s) and a different category of reason at the higher grade level(s). Examples of items in this pattern are the pseudo-letter and the rotated letters. In both the second and fourth patterns, variation was apparent in the level at which the "higher level" criteria began to appear. (In the second pattern, this criterion replaces acceptance. Whereas, in the final pattern, it is a "lower level" criterion which is replaced.) For some cards, the switch begins to occur within the Kindergarten sample, while for other cards only first graders use the more advanced reasoning.

From these analyses and the diagrams they provided, it was possible to construct a profile of predictable response patterns for each of five levels of graphic sense. Level 1 responses accept literally anything written down as readable. At Level 2, certain cards are rejected, but explanations of the reasoning behind the rejections are not adequately expressed. One or two instances of a Category 2 reason (e.g., "It's just a picture.") may appear at Level 2, but no more. Level 3 profiles may have several Category 2 and 3 responses ("It's just a flower, not a word."), and one or two responses from Categories 5 ("There's only two letters, that's not enough.") and/or 6 ("That's a 4, it's a number."). At Level 4, a much more varied response pattern begins to become evident, including all the above-mentioned categories as well as Categories 7 - 9. (Refer to Figure 3, above, for example responses.) Finally, the responses that distinguish the Level 5 profile are those which begin to accept those items rejected at all the earlier levels, e.g. the Chinese figure. These highest level responses also mention such criteria as "mirror image",

which reveal a very advanced level of awareness about the characteristics of the stimuli.

Graphic Sense Structure Location Task. Interpretation of GS-2 data required a combination of linguistic analytical and quantitative techniques. The questions on this task asked about the location of particular syntactic segments of the stimulus sentences, and the responses were children's gestural and/or verbal indications of where in the written sentences they thought the segments were represented. The first analytical task, then, was to understand the psycholinguistic features of the children's responses, the developmental ordering of these features, and the assignment of levels to configurations of responses by individual children. Once this was accomplished, we were able to utilize statistical techniques to understand the relationship between the card sorting and structure location tasks, and to compare the relationship of each of these to the sociographic variables.

Each of the responses for every child in the sample was first compared to the "correct" response, i.e. the response that would be expected of a literate adult. The manner in which each response differed from the expected response was recorded, and a master list of response features was compiled which was composed of any and all features used at least one time by any child in the sample. This list of features is presented in Table 7.

Using this comprehensive list, the responses of all the children were tabulated by features, and the percentage of children using each feature was calculated. The results of this procedure demonstrated that many of the features were

TABLE 7 GENERAL LIST OF TYPES OF RESPONSES (FEATURES) USED AT LEAST ONCE BY ANY CHILD

1. Correct Identification Of Major Grammatical Structures
2. Entire Sentence Located On One Word
3. Entire Sentence Located On More Than One Word But Fewer Than All Words
4. Right To Left Orientation
5. Left To Right Orientation
6. Back And Forth Orientation
7. Location Of Phrases On A Single Word
   a. Subject Noun Phrase
   b. Predicate
   c. Complex Verb
   d. Prepositional Phrase
   e. Object Noun Phrase
8. Same Location For Phrase And Component Contact Word Or Phrase
   a. Subject Noun Phrase
   b. Predicate/Verb
   c. Predicate/Object Noun Phrase
   d. Prepositional Phrase
   e. Object Noun Phrase
9. Location of Phrase On Its Head Word
   a. Subject Noun Phrase
   b. Verb Phrase
   c. Object Noun Phrase
   d. Prepositional Phrase
10. Location of Phrase In Its First Word
    a. Subject Noun Phrase
    b. Verb Phrase
    c. Object Noun Phrase
    d. Prepositional Phrase
11. Rejection Of A Grammatical Component
    a. Subject Noun Phrase
    b. Subject Noun
    c. Verb Phrase
    d. Verb
    e. Verbal Complement
    f. Object Noun Phrase
    g. Article
    h. Preposition
    i. Reflexive Pronoun
12. Correct Relative Position Of Phrases
13. Use Of Length Criterion For Content Words and Phrases
14. Verbal Completion Of A Phrase For A Single Word Stimulus
15. Elaboration Of The Basic Sentence

TABLE 7 (continued)

16. Pointing To Something In The Picture
17. Use Of All Segments In The Sentence
18. Location Content Words In Portions Of Words
19. Location Particles In Portions Of Words
20. Use of Single Letters For Particles
21. Use of Single Letters For Content Words
22. More Than One Item In the Same Location
23. Location Of An Item In More Than One Location
24. Location Of All Items In Every Segment
25. Correct Use of Particle
    a. the
    b. el
    c. la
    d. en
    e. se
26. Identification Of Both The's Simultaneously
27. Location Of Particle On A Content Word
    a. the
    b. el
    c. la
    d. en
    e. se
28. Location Of Particle On A Different Particle
    a. the
    b. el
    c. la
    d. en
    e. se
29. Correct Use Of IN
30. Syllabis Confusion With ASLEEP

either idiosyncratic or were used by very few children. Thus, in order both to reduce the data to manageable proportions and to utilize only those features that could be considered reasonably meaningful, features which showed no discernible pattern across age groups were eliminated from further consideration. None of the features thus eliminated were used by more than 15% of the children.

This reduced list of distinctive features was then tabulated by grade, language group, and picture task in order to see the patterns of growth for each feature. All the features showed substantial growth between preschool and first grade, as seen in Figures 4-21. However, a number of features showed either no growth or a decremental development between preschool and first grade for the Spanish dominant group. (See, for example Figs. 10, 12, 13, 15 and 20.) The reasons for this are unclear, but we may speculate that the graphic sense development of these children is interrupted or even disrupted by inappropriate content and/or techniques of instruction. These are geared more closely to teachers' ideas about the level of skill of English dominant youngsters from more middle-class backgrounds. The English dominant kindergarten group did not show this decremental pattern. Also, the first grade group demonstrated virtually complete mastery of all the features.

For these reasons, it seemed reasonable to use only the responses of the preschool children from both the Spanish and English dominant groups as the basis for determining the order of difficulty of the features. Table 8 gives the percentage of correct responses for each of the distinctive features by language group. Those features with a low percentage are to be considered

TABLE 8 RELATIVE DIFFICULTY LEVEL OF DISTINCTIVE GRAPHIC SENSE FEATURES FOR PRE-SCHOOL CHILDREN

	Percent Correct Responses Spanish	English
El On Content Word	85	--
Se On Content Word	75	--
La On Content Word	65	--
The On Content Word	--	63
Prepositional Phrase On A Single Segment	56	41
Subject Noun Phrase On A Single Segment	53	36
In On Content Word	50	50
Predicate On A Single Segment	48	50
Object Noun Phrase On A Single Segment	31	39
Different Items On A Single Segment	29	46
Location Of Object Noun Phrase Within The Prepositional Phrase	17	18
Correct Identification Of Article	15	39
Left To Right Orientation	13	49
Length Criterion	12	23
Relative Position Of Phrases	4	28.5
Correct Location Of Major Structures	3	16.5
Location Of The Verb Within The VP	0	29
Location Of Object Noun Within The Object Noun Phrase	0	26
Location Of Subject Noun Within The Subject Noun Phrase	0	8.5
Simultaneous Location Of Both The's	--	1.5

Fig. 4 SUBJECT NOUN AS PART OF SUBJECT NP

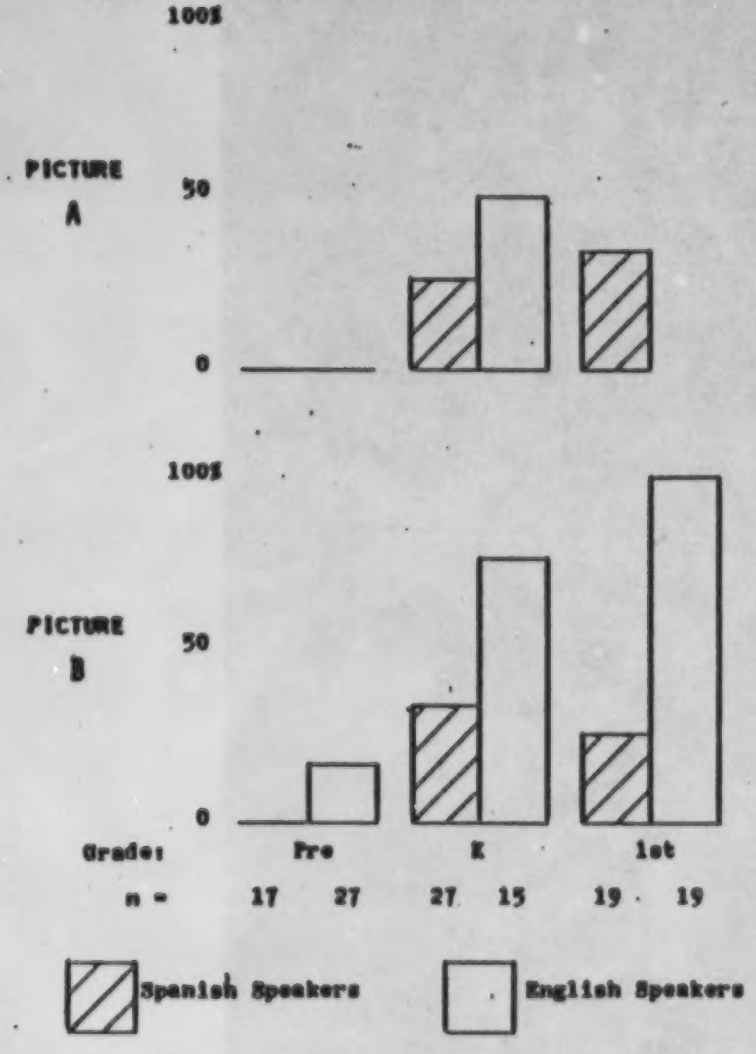


Fig. 5 VERB AS PART OF V

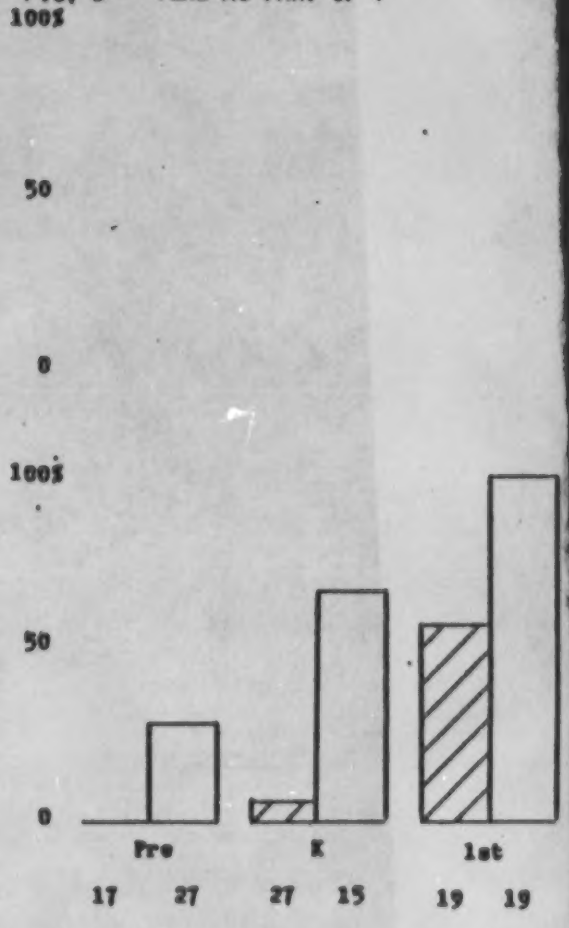


Fig. 6 OBJECT NOUN AS PART OF PREPOSITIONAL PHRASE

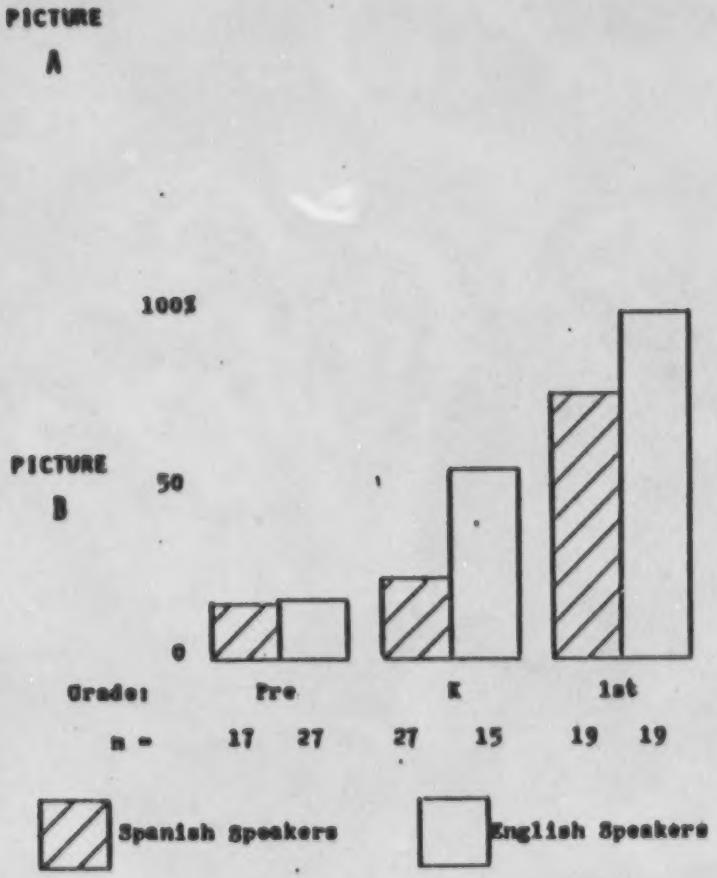


Fig. 7 OBJECT NOUN AS PART OF OBJECT NP

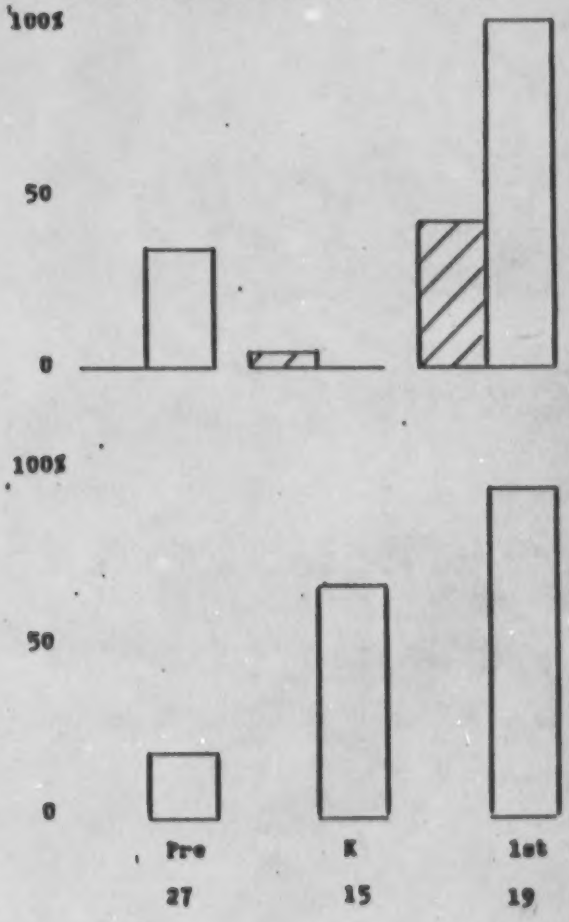


Fig. 8 CORRECT IDENTIFICATION OF EL

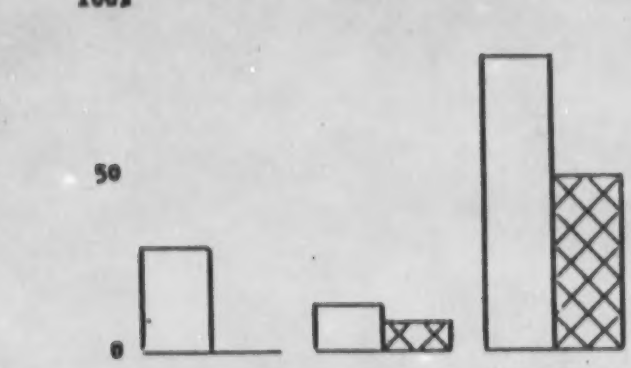


Fig. 9 CORRECT IDENTIFICATION OF THE

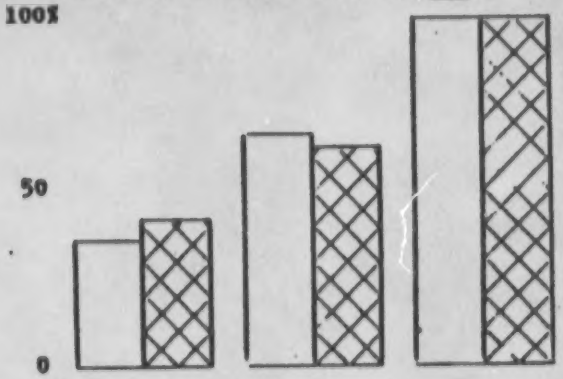


Fig. 10 CORRECT IDENTIFICATION OF LA

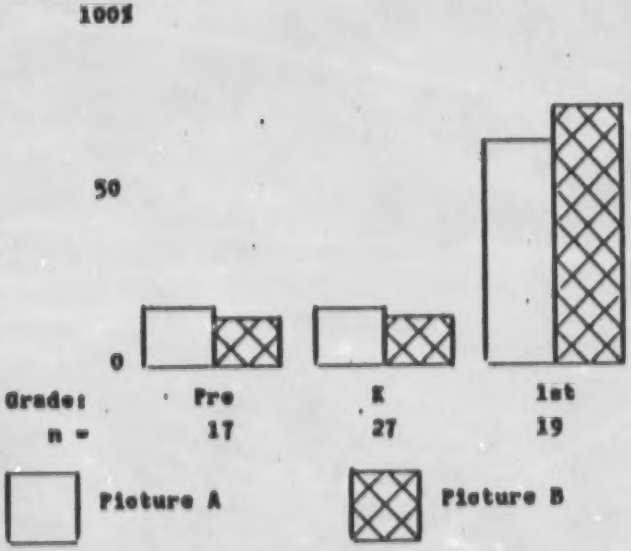


Fig. 11 SIMULTANEOUS LOCATION OF BOTH THE's

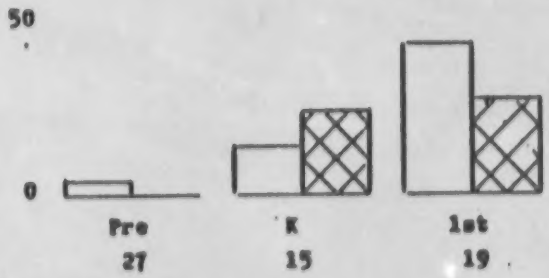
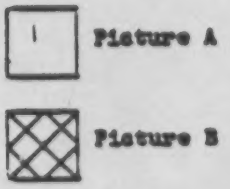
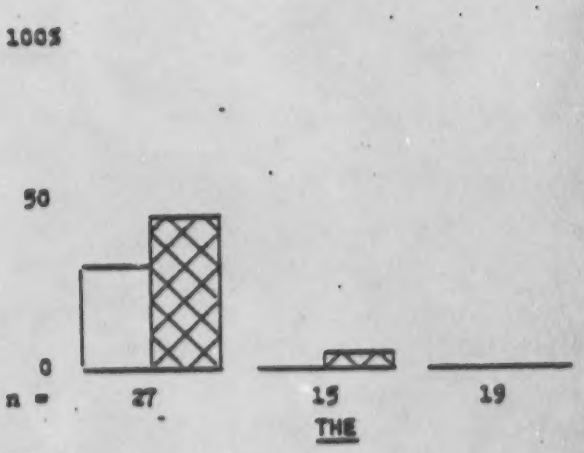
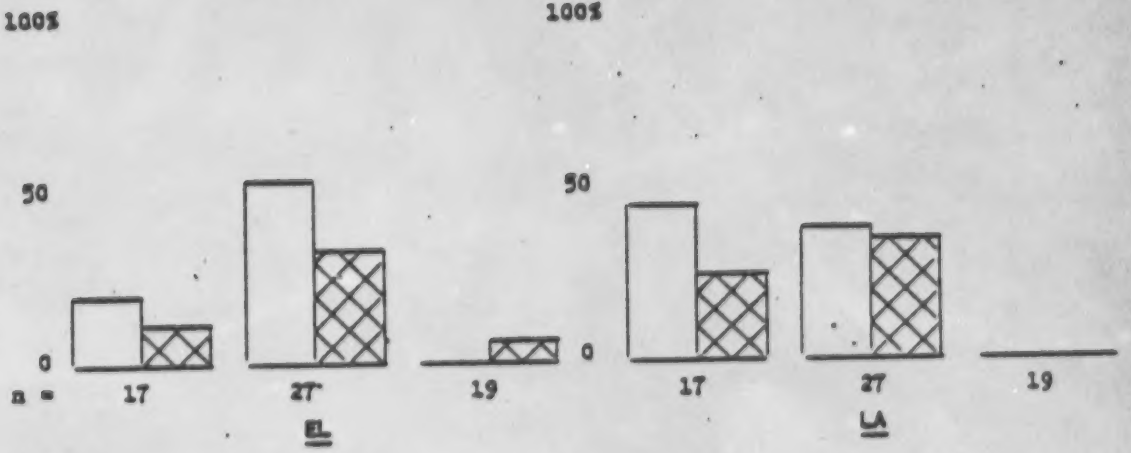


Fig. 12 LOCATION OF PARTICLES ON CONTENT WORDS AND PHRASES







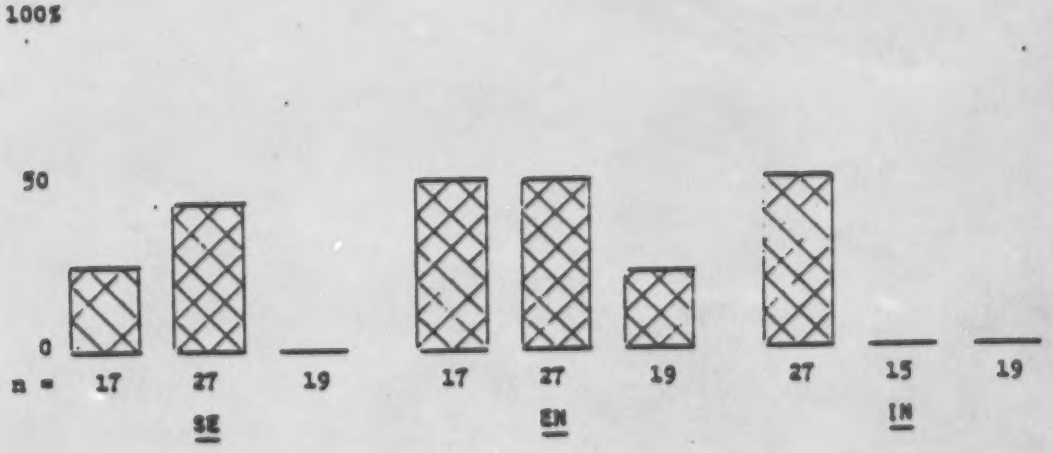


Fig. 13 LOCATION OF SUBJECT NP ON SINGLE SEGMENT

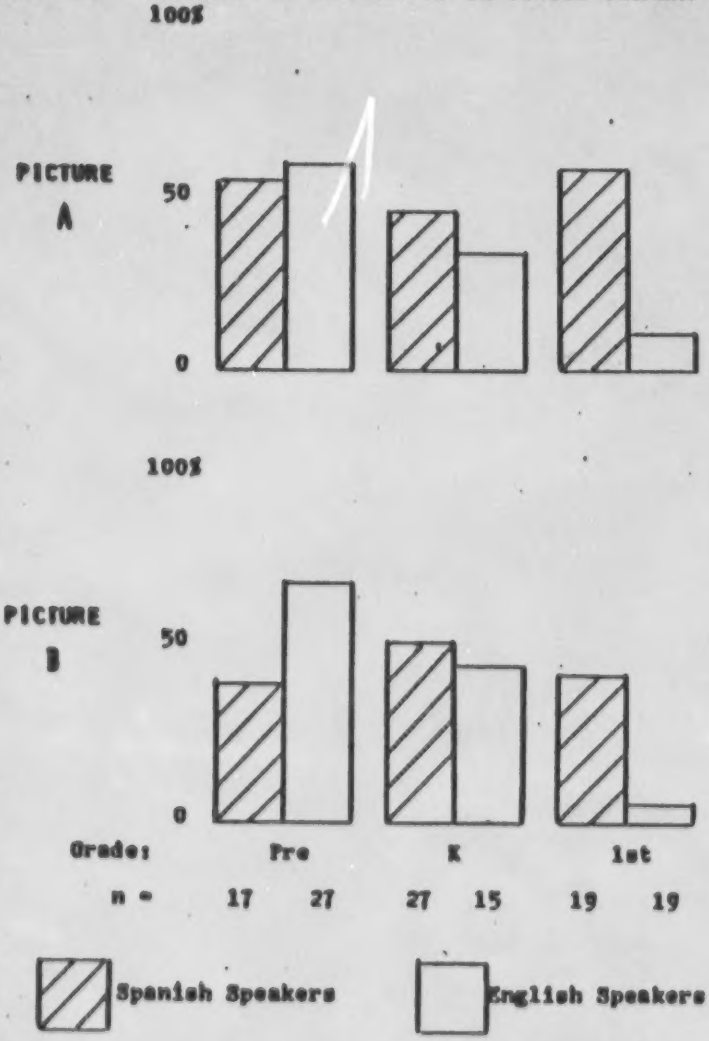


Fig. 14 LOCATION OF PREDICATE ON SINGLE SEGMENT

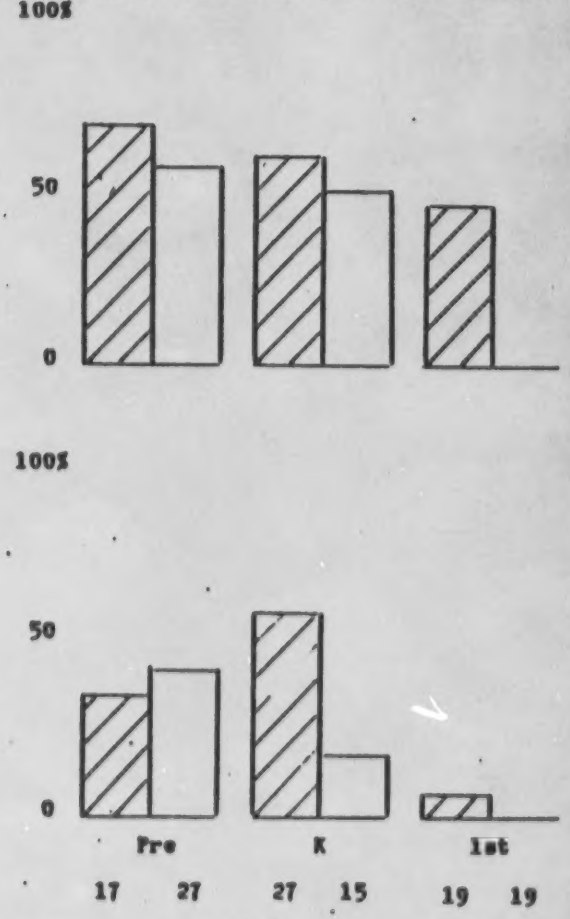


Fig. 15 LOCATION OF PREP PHRASE ON SINGLE SEGMENT

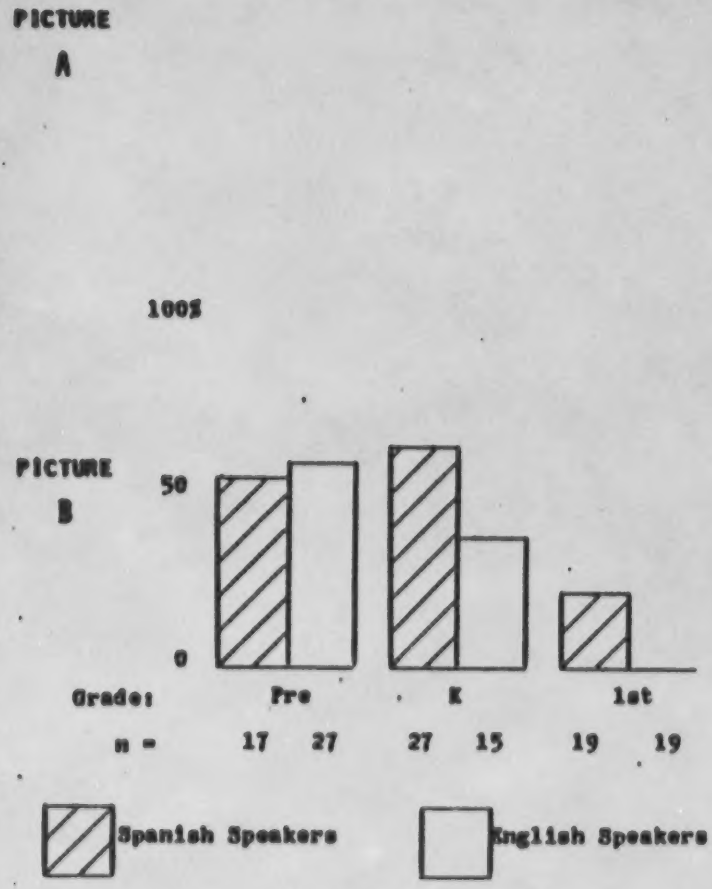


Fig.16 LOCATION OF OBJECT NP ON SINGLE SEGMENT

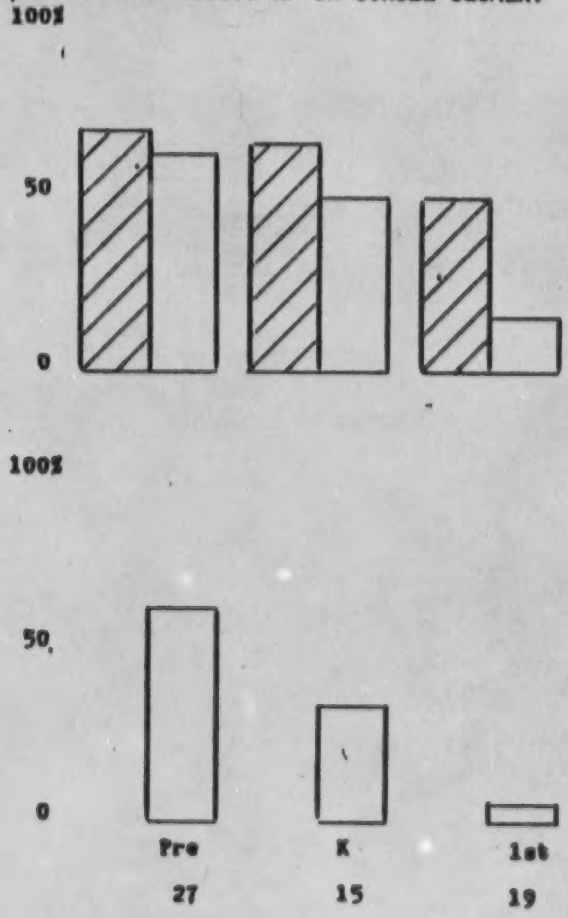


Fig. 17 LOCATION OF DIFFERENT ITEMS ON SAME SEGMENT

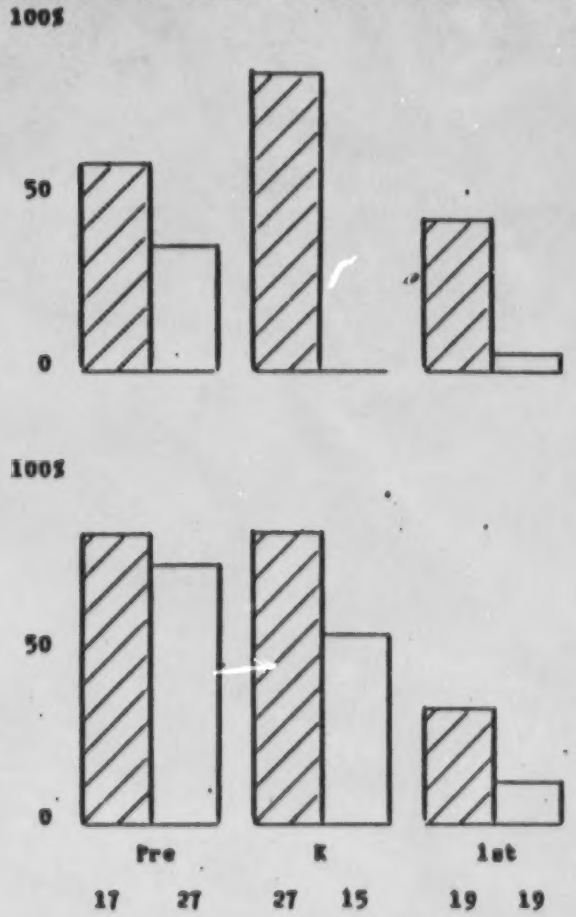


Fig. 18 RELATIVE POSITION OF PHRASES

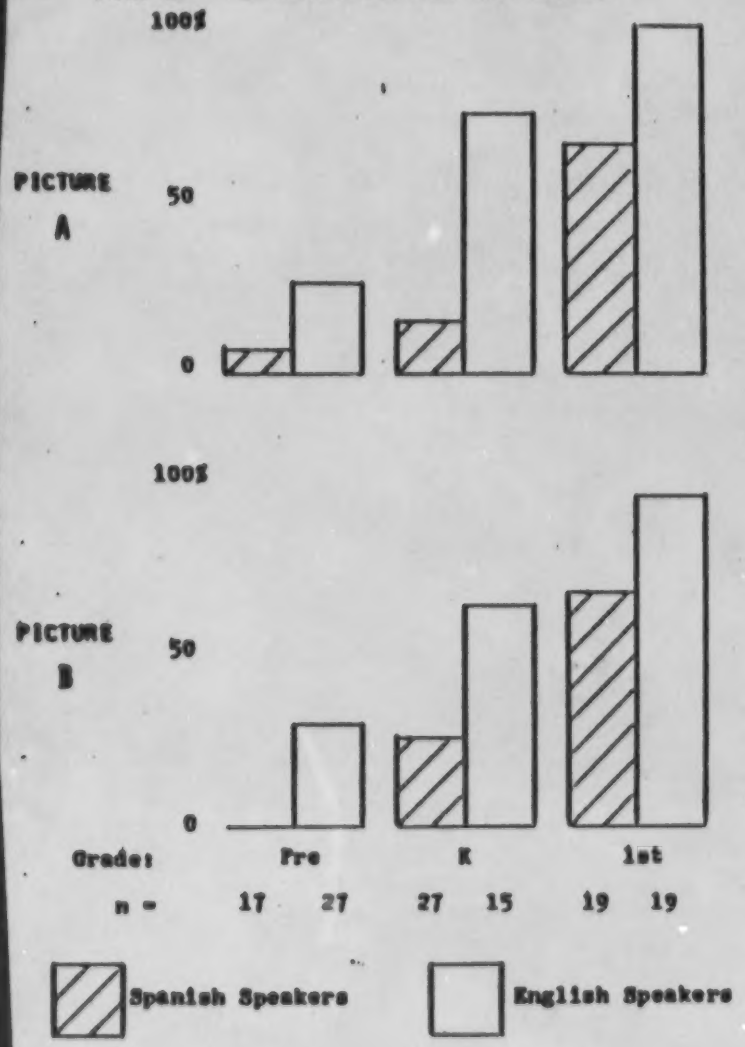


Fig. 19 USE OF LENGTH CRITERION

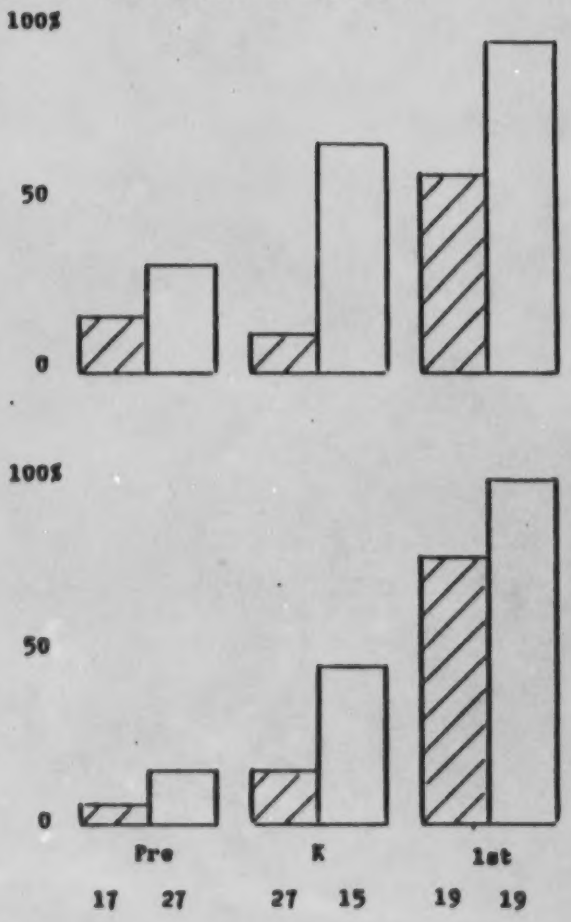


Fig. 20 LOCATION OF MAJOR GRAMMATICAL STRUCTURES

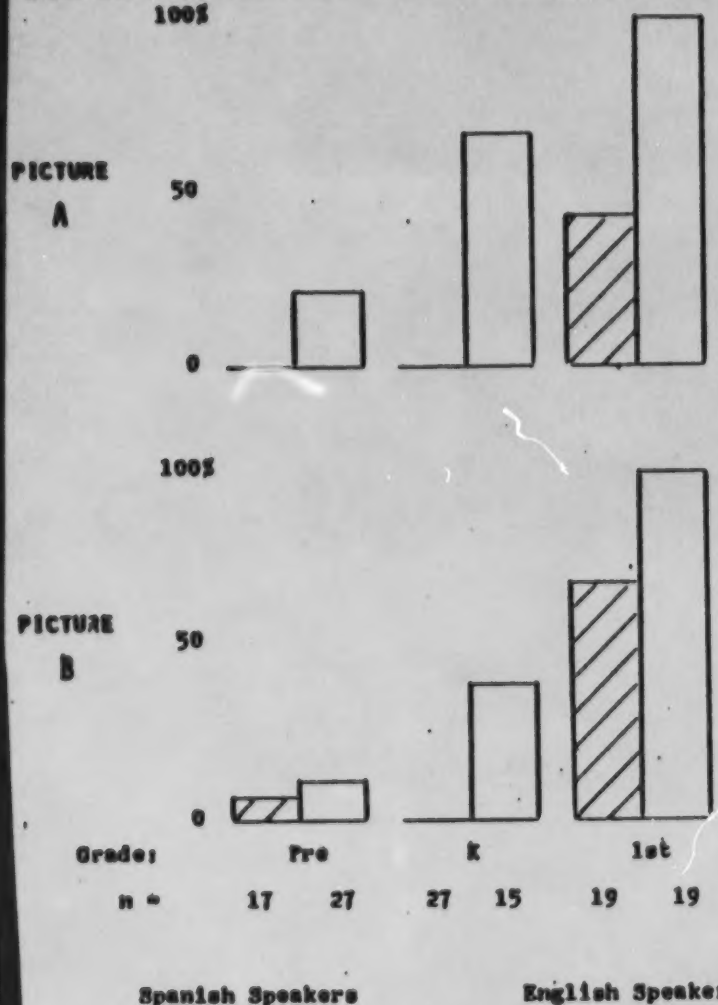
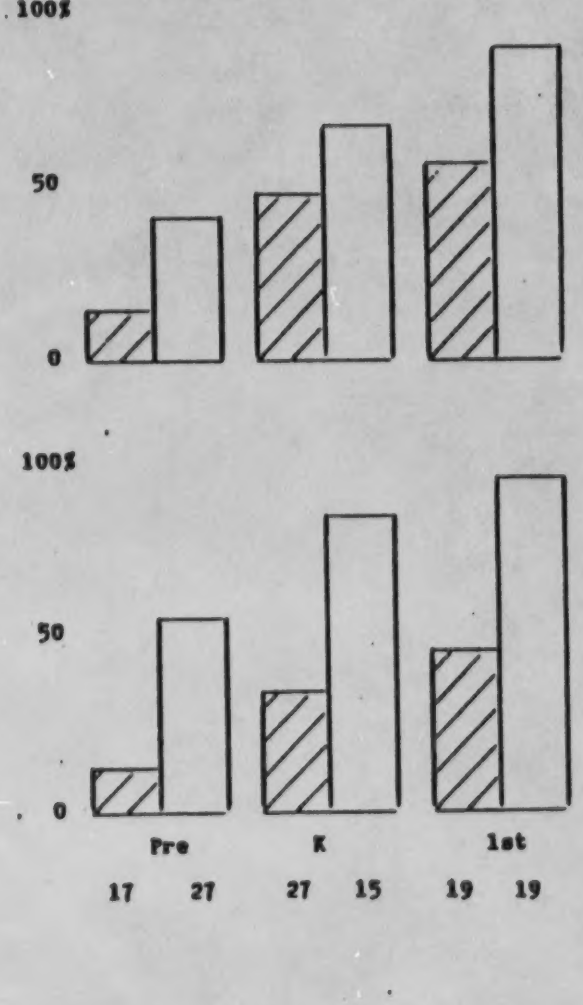


Fig. 21 LEFT TO RIGHT ORIENTATION



the most difficult, those with the highest the least difficult.

It is to be noted that, in general, the features are ordered similarly for both groups, though there are a few differences. These differences in relative order appear principally with the features of Left-to-right Orientation, Location of the Object Noun Phrase, and Subject Noun Phrase on a Single Segment. All the other features are ordered across language groups within one or two ranks of difference.

It is desirable with such an array, especially given the ranking into levels on GS-1, to attempt to find an implicational hierarchy among the features and to order them into levels. We note first of all that the features of Location of the Particles the, el, la, se on a Content Word share the characteristic of being the highest ranked in both language groups.

In on a Content Word would share that characteristic except that Prepositional Phrase and Subject Noun Phrase on a Single Segment are ranked higher in the Spanish group. Thus, the first four features stand alone as Level 2 by having the highest relative ranking for both groups.

Simultaneous Location of Both the's will be considered a Level 3 feature not only because it has the lowest rank in English (this feature is not applicable to the Spanish group), but because this response was produced only by those children who responded correctly to all other features. I.e., a correct response on this feature implies that all other features are mastered (though not vice versa).

It is this criterion of mutual exclusivity of rank among the features that we then apply throughout this portion of the analysis to establish the implicational hierarchy and thus the levels of GS-2. In this way we find that certain features, taken as a group, are mutually exclusive in rank from other features. These are the features of Length Criterion, Relative Position of Phrases, Identification of Major Structures and the Location of the Verb and the Object Noun within their respective phrases. Only Location of Subject Noun within its phrase is lower in both languages. The latter feature, then, we consider to represent Level 4, and the former to represent Level 3. The remaining features, with the exception of location of object noun phrase in the prepositional phrase, are mutually exclusive from all the rest and comprise Level 2.

In this way, the features in each level are the same features for both language groups (except at Level 5 which is unique to English). Within each level, the features are ordered similarly, though not exactly the same for each language. But none of the features from any one level overlaps those of another level.

The one exception, as noted above, pertains to Object Noun Phrase in the Prepositional Phrase. This feature is clearly in Level 2 for English but overlaps in rank with two features of Level 3 in Spanish.

However, because of its low absolute rank overall, and because the overlap in rank is so minor (17% versus 13% and 15%), we feel justified in assigning this feature to Level 3 for both languages. Despite the inconsistency, this seems preferable to assigning a single feature to different levels.

Once the levels are assigned, it becomes possible to compare the relationshp of GS-1 and GS-2 directly and to make similar comparisons with other variables, both sociographic and educational.

Sociographic Variables as Predictors of Graphic Sense

Table 9 demonstrates the relative predictive value of a number of home variables upon the developmental level of GS-1 and GS-2. The factors selected for inclusion the Years of School for both parents (MS, FS), Level of Literacy for both parents (ML, FL), Reading and Writing Activity of each parent and the focus child (MR, FR, CR), Social and Dyadic Literacy activity (SR, DR), and the Types and Quantity of Reading and Writing Materials available in the home (CB, M, WM) were chosen because their influence upon reading achievement has been discussed in several studies (Wells 1978, Holtzman et al 1975, Ramirez and Castaneda, 1974).

As can be seen, the multiple-R obtained on both measures is quite high. On GS-1 it is significant at the .001 level and on GS-2 at the .01 level. Thus , as expected, home socialization practices with regard to literacy, as measured by the sociographic variables are strong predictors of graphic sense level. That is, the quality and amount of the child's informal experiences with written language is reflected fairly directly in his or her skill in the graphic sense tasks presented.

The most powerful predictors for both GS-1 and GS-2 are whether or not the

TABLE 9 BETA WEIGHTS AND MULTIPLE CORRELATION COEFFICIENTS FROM THE MULTIPLE REGRESSION OF SOCIOGRAPHIC VARIABLES UPON GRAPHIC SENSE LEVELS

GRAPHIC SENSE							BETA WEIGHT FOR PREDICTOR VARIABLES											
TASK	N	$\bar{X}$	SD	R	DF	F	MS	FS	ML	FL	MR	FR	CR	SR	DR	CB	M	MM
GS I	114	3.20	1.06	.58**	12 92	3.97	-.012	.163	-.089	-.135	.126	-.133	.451	.056	.224	-.083	.232	.043
GS II	114	2.17	1.28	.50*	12 92	2.58	-.240	.101	.168	-.175	.074	-.069	.311	.247	-.114	.042	.323	.002

*p $\leq$ .01
**p $\leq$ .001

child engages in "reading" activities (CR) and the presence in the home of magazines and newspapers (M). Other fairly strong predictors for both measures are father's reported level of literacy (FL) father's educational level (FS), and the practice of dyadic reading activities involving the child (DR). The first two of these reflect SES rather then socialization practices. However, it is reasonable to expect that the father's schooling and literacy would affect in a fairly direct manner the sociographic variables themselves.

Mother's Schooling (MS), Mother's Level of Literacy (ML), and Social Reading Activities in the home (SR) are fair predictors of GS-2 though not of GS-1. In contrast, whether or not the mother and father engage in reading (MR, FR) predict GS-1 to some extent but not GS-2.

These differences must certainly inhere in the nature of tasks and in the relationship of the particular sociographic variables to those tasks. We may speculate that social reading is done more in homes where the mother's schooling and literacy are relatively high and that in these situations the child acquires the skills necessary for the interpretation of text (GS-2). These skills many not be developed by the mere fact that mother and/or father engage in reading. However, the latter conditions are related to the presence of reading material in the home, and the child would thus begin to understand the nature of graphic symbols and acquire notions about what is and is not readable (GS-1). These are but some possible interpretations, but the more precise establishment of the relationships of sociographic variables to graphic sense must await further study.

The Relation of Graphic Sense to Other Test Data

In order to understand the relationships of graphic sense to oral language proficiency, cognitive development, and the more traditional measures of school achievement, Spearman correlations were performed between GS-1, GS-2 and a variety of other test data collected during the course of the project. A summary of the data obtained through these procedures is presented in Tables 10 and 11.

There are very few correlations, with either GS-1 or GS-2, that attain a level of significance. With both measures of graphic sense, the oral language proficiency scores on the BSM English show moderate correlations for both language groups. In addition, the BSM Spanish is moderately correlated with GS-1 for the Spanish dominant group.

GS-1 correlates moderately to high with several sub-tests of the CTBS (First Grade) for the English group: Letter Sounds, Word Recognition II, and Reading Comprehension. None of these show a significant correlation for the Spanish group.

The SPSP (Kindergarten) does not correlate significantly with GS-1 for the English group, and only the Letter Identification sub-test shows a moderate positive relationship with GS-1 for the Spanish group. Also for this group, Visual Discrimination-Words and Visual Memory show fairly strong but negative correlations with the card sorting task.

TABLE 10 SPEARMAN'S RHO CORRELATIONS BETWEEN GS I LEVEL AND TRADITIONAL SCHOOL MEASURES

	SPANISH DOMINANT		ENGLISH DOMINANT	
Test	N	r_s	N	r_s
BSM, Spanish	52	.376*	57	.174
BSM, English	52	.539*	57	.300*
CPI (Preschool)	17	.261	26	-.023
SPSP Subtests (Kindergarten				
Visual Discrimination, Letters	24	.258	13	.460
Visual Discrimination, Words	24	.150	13	.310
Visual Memory with Discrimination	24	.418	13	-.268
Fine-Motor Coordination	24	.021	13	.025
Visual-Kinesthetic Memory	24	.257	13	-.099
Auditory Discrimination	24	.249	13	-.046
Letter Identification by Name	24	.412*	13	.324
CTBS Subtests (First grade)				
Letter Sounds			18	.402*
Word Recognition I	11	-.069	18	.330
Word Recognition II	11	.177	18	.697**
Reading Comprehension	11	.496	18	.499*
CTBS Total Raw Score	11	.218	18	.520*
STEA	35	.228	30	.473**

*$p < .05$
**$p < .01$

TABLE 11 SPEARMAN'S RHO CORRELATIONS BETWEEN GS II LEVEL AND TRADITIONAL SCHOOL MEASURES

	SPANISH DOMINANT		ENGLISH DOMINANT	
Test	N	r_s	N	r_s
BSM, Spanish	52	.217	57	.186
BSM, English	52	.377*	57	.394**
CPI (Preschool)	17	-.064	26	-.327
SPSP Subtest (Kindergarten)				
Visual Discrimination, Letters	24	-.007	13	.400
Visual Discrimination, Words	24	-.347*	13	.431
Visual Memory with Discrimination	24	-.476*	13	.336
Fine-Motor Coordination	24	.516**	13	.509*
Visual-Kinesthetic Memory	24	.211	13	.383
Auditory Discrimination	24	.146	13	.060
Letter Identification by Name	24	-.220	13	.321
CTBS Subtests (First Grade)				
Letter Sounds			18	.000
Word Recognition I	11	.346	18	-.104
Word Recognition II	11	.483	18	.091
Reading Comprehension	11	-.081	18	.078
CTBS Total Raw Score	11	.303	18	.039
STEA	35	.586**	30	.537*

*$p < .05$
**$p < .01$

GS-2 shows a clearer pattern of relationships. For most tests, there are no significant correlations, though several show moderate relationships with GS-2 that do not reach significance. Three tests show quite strong correlation, with GS-2 for both language groups: BSM English, the Fine Motor Coordination sub-test of the SPSP (Kindergarten) and the STEA.

The CPI (Pre-school) shows no significant relationship with either GS-1 or GS-2 for either language dominance group. These results will be discussed in the following chapter.

Relationship of GS-1 and GS-2. It is of great interest to know whether the very different skills measured by the card sorting and structure location tasks are related. The assumption governing the development and use of these tasks as measures of graphic sense was that, even though notions about what sorts of things are readable is a very different kind of knowledge from that required to locate structures in a text, both skills underlie the acquisition of literacy and thus are integral components of graphic sense.

Table 12 provides the correlation coefficients between GS-1 and GS-2 for each of the language dominance groups. The two measures show significant and moderate to fairly strong correlations for both groups. This is evidence that both tasks tend to assess the same underlying construct.

TABLE 12 PEARSON CORRELATIONS BETWEEN GS I AND GS II FOR SPANISH AND ENGLISH GROUPS

	r	X	SD
SPANISH DOMINANT	.32*	1.67	.94
ENGLISH DOMINANT	.58**	2.67	1.59

*p $\leq$ .01
**p $\leq$ .001

CHAPTER IV. DISCUSSION AND CONCLUSIONS

The results of this study clearly support the proposition that children pass through developmental stages in their understanding of written language. This conclusion and others which can be drawn from the data in answer to the research questions posed in Chapter I will be discussed in this section. In addition, data collected by means of the Graphic Sense Card Sorting Task and the Graphic Sense Structure Location Task will be examined with regard to some of the notions characteristic of certain stages in the development of graphic sense as they relate to Ferreiro's (1976, 1978) findings and those of other researchers. A section will be devoted to suggestions for the improvement of these instruments, should revision be undertaken. Areas in need of further theoretical and methodological study will also be proposed. Finally, this chapter will present the implications for education offered by these findings.

Graphic Sense as a Developmental Process. Certainly the data provided by the children's responses to the GS-1 AND GS-2 tasks have demonstrated that the acquisition of graphic sense is a developmental process. Stages in the development can be identified by the criteria used by children at each level in deciding whether particular graphic representations can or cannot be read and where portions of an utterance are located in a text. On both of these tasks, the kinds of responses given by the younger children were different from those given by the older children within each language group. The number of

"correct" responses, i.e. the conventional interpretations that would be given by literate adults, increased systematically according to age group. This kind of pattern is characteristic of a developmental process rather than of one which reflects concepts or skills learned in an idiosyncratic or arbitrary order. This interpretation is strongly supported by the fact that children who had had no formal instruction in reading acquired notions about written language that were strikingly similar within an age group.

The responses given by Spanish dominant and English dominant children show that children from both language groups use the same criteria in their decision making. In GS-1, children from both groups tended to accept or reject the same cards and to offer the same reasons for considering some cards readable and others not. Moreover, four-year-old monolingual Spanish speakers, who have had limited contact with the Anglo-American culture, nonetheless gave reasons for their rejection of certain cards which were identical (except, of course, in Spanish) to those given by the English dominant preschoolers. In GS-2, both the Spanish and in English dominant children had similar ideas about whether and where particular sentence structures were to be read in a written sentence.

Additionally, on each task, younger children from both language groups tended to respond in the same way as did the older children. That is, there exists an age-related ordering of the responses that is characteristic of both groups. The major difference between the groups was that the Spanish dominant children tended to make lower level responses than the English dominant children of the same age. This pattern is explainable by the differences in the

out-of-school experiences with written language which are the social basis of graphic sense development. Given the limitations on the extent to which these results may be generalized to other populations of children - namely, those who do not live in Calistoga - the validity of a statement regarding the general nature of graphic sense would be premature. Nonetheless, the striking similarities between these two cultural groups that are apparent in the structure of graphic sense suggest that their responses are governed by the same underlying cognitive processes.

Relationship to Sociographic Factors. The level of graphic sense, as defined by the patterns of responses on both GS-1 and GS-2, is strongly related to the nature of a child's exposure to and interaction with written language at home. This confirms one of our major hypotheses that sociographic factors are crucially important in the acquisition of graphic sense. In addition, this relationship supports the notion that graphic sense is a developmental phenomenon, acquired natually in a way similar to that of other cognitive developmental processes. The sociographic factors serve as the indispensable input from which the child reconstructs the written code in a way that is fully analogous to the process that operates in oral language acquisition.

The most predictive sociographic factors for both GS-1 and GS-2 levels were whether or not the child engages in solitary or dyadic "reading" activities and the presence of magazines and newspapers in the home. That is, the child's personal and direct participation in sociographic actitivites is the most important factor in graphic sense development. The presence of popular reading materials would also seem to provide the child with opportunities to

interact with print in the home in any number of ways.

Whether or not the parents engage in reading is moderately predictive for GS-1 only. Observation of these activities would tend to provide information to the child about the nature of the symbol system used, but not necessarily about how to interpret text. On the other hand, parent's literacy has a similar relationship to GS-2. More literate parents, it seems, would be more likely to interact with the child in his or her reading activities and to give assistance in the interpretation of texts. Whatever the underlying explanations, the most important point to be made is that the sociographic factors have a demonstrably systematic relationship to graphic sense level. Other observers have noted the general relationship between parents' SES and children's academic achievement. The findings reported here, however, begin to explain why such a relationship exists. It is not, we submit, because lower SES children are less intelligent or have less motivation, or have less support from their parents for academic achievement. Rather, there are important cultural differences with respect to academically important activities. The schools typically are unaware of what these differences are and consequently fail to take them into account in their instructional programs.

Reading Readiness and Achievement. There was no demonstrated relationship between graphic sense and "readiness" for school as measured by the Cooperative Preschool Inventory. Neither could a strong relationship be demonstrated between graphic sense and reading readiness as measured by the Slingerland Pre-Reading Screening Procedures. A single subtest of the

Slingerland revealed a correlation between the Spanish dominant Kindergartners' knowledge of letter names and GS-1. This suggests that the ability to name letters is related to and probably dependent upon an understanding of the kinds of symbols that are possible written representations.

The only positive correlations of the Slingerland with GS-2 were on the Fine-Motor Coordination sub-test for both groups of children. This would inidicate that the experiences that develop this particular skill and that enter into the interpretation of written text are related. However, the findings of their study do not permit a more detailed interpretation.

The lack of any other positive relationships between the reading readiness tests and either GS-1 or GS-2 confirms our hypothesis that what these tests measure are notions that are very different from the conceptualizations about written language that children acquire informally through socialization experience. It is this latter knowledge that children bring with them to the school and that traditional readiness measures fail to tap.

Reading achievement scores of English speaking first graders are related to GS-1 but not GS-2. These relationships may be explained by the fact that there was variability in their responses on GS-1 - as there is on reading achievement - but not on GS-2. Level of graphic sense (measured only by GS-1 for this group) is thus strongly related to reading achievement. Reading achievement testing measures the relevant skills involved in reading much more accurately than do reading readiness tests. Thus the relationship of graphic sense level with the former but not the latter gives important support

to graphic sense as a valid construct.

The reading achievement scores of the Spanish dominant sample, however, are not related to graphic sense, either on GS-1 or GS-2. The difference between the Spanish and English groups may be explained in a number of ways. A very likely explanation is the questionable equivalence of the English and Spanish versions of the CTBS. The subtests in Spanish are direct translations of the English test. There is no reason to suspect (and many reasons to doubt) that the translations of first-grade level words in English would necessarily be first-grade level words in Spanish.

Another set of reasons for the discrepancy may relate to cultural difference. The Mexican students are mostly children of migrant farmworkers. They are much less likely than the Anglo-American children to have had experiences of an academic nature, in particular the kinds of experiences involved in test-taking. Despite the care taken to devise culturally neutral procedures, the nature of the tasks involved questions and discussion about reading - a cultural less familiar topic to these children. The children may have been less familiar with the task, less inclined to guess, and less comfortable in the test setting.

Beyond the test themselves, we may speculate that these children's graphic sense develops normally given their socialization experiences but that they fail to learn to read in the academic context because the methods and the level of instruction are so poorly matched with the skills they bring to the classroom. Indeed, the flat and decremental patterns on GS-2 described in the preceding

chapter for the Spanish speaking group suggest that this instructional mismatch only inhibits the children's reading achievement, it also has a deleterious effect on the normal development of graphic sense. Faced with instruction that is totally inappropriate to their graphic sense level, the children become confused and begin to question the validity of their previously acquired knowledge.

Cognitive Development and Graphic Sense. There exists a strong relationship between I.Q. - as measured by the STEA - and graphic sense. These are entirely reasonable and expected relationship given the nature of the two tasks. GS-1 requires the attention to a variety of relevant dimensions that conjointly define a highly abstract symbolic code. GS-2 demands the further interpretation of this code and an understanding of its relationship to oral language, itself an abstract symbolic object. GS-1 and GS-2 are aspects of Cummins' (1978, 1980) cognitive academic linguistic proficiency (CALP) which is closely related to general cognitive ability.

Cognitive development (I.Q) and the sociographic variables are thus found to be the two most important factors in the development of graphic sense. Level of English oral language proficiency is also quite important for the Spanish dominant group, but this is undoubtedly related to instructional practices in the school. If reading activities are introduced principally through English, those children who have a better oral master of this language will tend to progress more rapidly in their understanding of the oral-graphic relationships.

Comparison with Findings from Previous Research. Profiles of predictable

response patterns for each of the five levels of graphic sense, obtained through the analysis of the Graphic Sense Card Sorting Task data, describe the stages in terms of the graphic features to which children at each level attend. From these, the level at which a particular feature becomes important to children can be understood. For example, it can be inferred that the distinction between writing and pictures begins at Level 2, although the child's ability to express this distinction does not appear until Level 3. Ferreiro (1976) found that all her four year old subjects distinguished text from pictures. Gibson (1970) reports that most of the three-year-olds in her study were able to distinguish writing from pictures. Downing (1969) on the other hand, found that many five-year-olds still confused writing with pictures. Organization of the graphic sense data by grade rather than age will not permit a comment on a typical age level response in the present study. However, eight of the seventeen Spanish dominant preschoolers and one of the twenty-six English dominant preschoolers did not distinguish between pictures and print. These data do not help to clear up the ambiguity of the research findings on this issue. Since the tasks in each of these studies as well as the characteristics of the various samples were different, there can be no definitive "answer" regarding the age at which writing and pictures are distinguishable.

Another feature to which children begin to respond at Level 2, and begin to explain at Level 3, is length of the string. While all subjects across the sample accepted the three-letter word as something to be read, and all the Spanish dominant preschoolers accepted the two letter word as readable, about a third of the English dominant preschoolers and the same proportion of the English dominant Kindergartners rejected the two-letter word as being too short to be

readable. A majority of the Spanish dominant Kindergartners rejected the item for the same reason. This tends to confirm Ferreiro's finding that four-year-olds demand a minimum of three letters for something to be "for reading." (1976)

Ferreiro also reports that letters and numbers are confused by four-year-olds, but the distinction begins to be made by the age of five. Reid (1966) found that first graders cannot easily distinguish numbers from letters or words. The GS-1 data support these findings. Whereas the single digit "4" is rejected by a majority of the English dominant children in all three grades because it is a number, the four digit number string "5348" is accepted by the English dominant preschoolers and by the Spanish dominant children until first grade. (Most of the Spanish dominant Kindergartners reject the "4", but because it is not long enough to be read, not because it is a number.)

Finally, repetition of elements was noted by Ferreiro as being objectionable to all but one of her four-year-old subjects. Both of the cards included to test this dimension were acceptable to the Spanish dominant children until first grade, and to the English dominant preschoolers.

Generally speaking, Ferreiro's four-year-olds seem to use the same criteria as are characteristic of GS-1 Level 3. This is to say that her sample appears to have been more advanced developmentally than the Calistoga sample, especially the Spanish dominant children. There are sixteen preschoolers, six Kindergartners, and two first graders from this language group who have yet to arrive at Level 3. There are six English dominant preschoolers in the

Calistoga sample who are below Level 3.

It is somewhat more problematical to compare the results of GS-2 to Ferreiro's findings. She found that in early development, children perceive that a text may represnt subjects and objects but no verb. Articles are not considered by children to form part of a written sentence. It is only at the most advanced levels that children become aware of the phonological divisions in the words.

Our findings show that, in general, children were able to locate all the grammatical elements of a sentence in the written text. (Some were placed correctly, some incorrectly, but they were all placed somewhere.) This difference is most probably due to the way in which the tasks were presented. The GS-2 was presented by means of a drawing and an associated sentence which may have allowed the children to keep in mind all the elements of the stimulus sentence. Nevertheless, we did find that correct location of the article was the most difficult of the tasks. This is similar to Ferreiro's finding that children did not locate the article in the sentence although few of the Calistoga children rejected the article outright.

Our other findings showed also a differentiation of response according to grammatical category. However, the ordering of the categories was not the same as Ferreiro's. The Calistoga children had greater relative difficulty first with prepositional phrases followed by subject, predicate, and object, the latter of which tended to be the easiest.

Our intention was not to replicate Ferreiro's work but to investigate the nature and structure of graphic sense in a bilingual community in the U.S. Therefore, there was no serious attempt to use her exact methodology nor even to ask the same questions. Thus, it is not of great concern that the specifics of the children's responses were different. What is of interest, given the difference in the two studies, is that some of the specific findings do coincide and that the children do differentiate their development according to grammatical categories. These are important results inasmuch as the two studies were carried out in very different sociocultural and sociolinguistic contexts. From this we can conclude that graphic sense (Ferreiro's "conceptualizations of written language") is a general phenomenon, developed by children naturally under given conditions of exposure to print, and that its characteristics are governed not so much by the specifics of the input as by the nature of this child's cognitive organization.

Methodological Considerations. If the Graphic Sense Card Sorting Task were to be revised for use in future research, a number of changes would be advisable. These include recommendations for changes in the stimuli on several of the cards, revisions of the instrument, and of the procedures for administration.

First, a new base word for the Spanish version needs to be chosen. This is because the word luna contains the letters, u and n, which are inversions of each other. Several of the children focused on this feature in their responses to a number of items, basing their rejections upon the observation that the n

was "upside down." The Chinese character (Card 15) could also be replaced. Many children in both language groups responded to its "squareness", which is in fact, a feature of this particular figure that distinguishes it from most other Chinese characters. The character represents the word "country", and its four sides are presumably related to the boundaries of its referent. However, it is possible that a greater number of children might recognize a more typical Chinese figure and decide that it could be read. Card 6, on which the four letters of the baseword are spread out in a circle, also needs to be changed. The dimension along which variation was intended was that of linear orientation of the string. However, many children responded to the space between the letters, apparently attending to the dimension of segmentation. If the elements were closer together, but still within the circle, the child's reasons for rejecting the card would be more clearly understood. Finally, Cards 3 and 17 (the "scribbles") need to be made to look more like scribbles and less like m's. Several children based their rejection of these cards upon the "repetition of graphic symbols."

If greater reliability were desired, several changes would be needed in the instrument itself. Having the stimuli printed on the cards in regular manuscript letters would be preferable over the calligraphy (printed by hand) for the present study. If the test were to be published and used by the public schools to diagnose the graphic sense level of individual children as a measure of reading readiness, then it would be desirable to include at least three items of each type. That is to say that a child's use of a particular criterion cannot be reliably inferred from the response to a single item. Similarly, it might be wise to vary the stimuli from more than one baseword. It is possible,

especially with the more advanced subjects, that some items were accepted because the baseword was recognized within a configuration that might otherwise have been rejected. Finally, a number of items (those which were accepted across the entire sample) could be eliminated from the test, since they fail to provide any useful data.

Two changes are recommended in the administration of the task. Variation in the order of presentation of the items might have an effect upon the subjects' responses. This could be tested by designing separate forms of the test, varying only in item order, and comparing the responses of subsamples to the different forms. The final modification advised is that examiners be trained to probe on indeterminate responses. It is very possible that some of the Level 2 subjects could have explained their rejections if the examiners had been more persistent in their inquiry.

The GS-2 instrument had somewhat different problems. One is that the level of difficulty of the items is too low for most English speaking first graders. For these children, additional items need to be included that explore their understanding of the phonological relationships between oral language and print as well perhaps as other metalinguistic knowledge.

On Picture B, the stimulus sentence will need to be changed. One problem with it is that the form asleep on the English version poses problems of morphological segmentation that are not equivalent in the Spanish version. Similarly, the phrases fell asleep and se durmió are not equivalent either structurally or in terms of the feature of length for the first word of the

phrase.

In terms of the questions asked in its administration, it will probably be preferable to focus attention completely on the stimulus sentence rather than to ask the children to analyze their own production. In this way, all of the questions could be standardized for every child.

Research and Educational Implications. Several questions have been raised in this study which are worthy of further research. Perhaps the most obvious is the need to more clearly define the acquisition of literacy as a developmental process. This can only be accomplished by following the same children through a sequence of stages in the development. This will require the collection of longitudinal data on a sample of children over a minimum of two years.

The effects of bilingualism upon the development of graphic sense is certainly worthy of attention. Indeed, the relationship between graphic sense and oral language proficiency in both first and second languages needs to be examined in much greater detail. The apparent correlation between the two may in fact be caused by a third factor, some as yet vaguely defined "aptitude for code-breaking" which affects the rate of development in the acquisition of oral language and in the acquisition of literacy as well. A related question concerns the development of graphic sense for the child whose primary language is only experienced in its oral form, and who is exposed to a second language in print. What will be the conceptualizations of this child regarding written language?

The theory of the development of graphic sense has serious implications for education. If the theory is accepted, and the child's success in learning to read can be seen as a function of the match between his or her conceptualizations (level of graphic sense) and the focus of instruction, then clearly it is the business of educators to design instruction which "fits" children at each of the various levels at which they come to school. This is qualitatively different from current educational theory and practice. Individual and group differences in readiness for reading instruction have been viewed in terms of "cultural disadvantage" and have been "treated" with "compensatory education." The assumption implicit in this approach is that by means of such "compensation" the children can (and should) be changed into Anglo-American middle-class-like students who will then be able to benefit from the instructional program of the schools. Curriculum according to this model provides for the introduction of phonics at the Kindergarten level. Children who don't "get it" just "get it" over and over again until they do.

The theory of graphic sense development calls for a completely different approach to curriculum design. Individual and group differences in developmental level are not seen as a function of ethnicity or language group. Differences in socialization practices and sociographic variables appear to affect the development of graphic sense. Due to the variation among families on these dimensions, children enter Kindergarten at every level of development. Instructional strategies can be (must be) designed which are appropriate to each child's level of reasoning. Consider an example. A lesson which focuses on the letter cluster "at", and upon all the words which can be built upon it (e.g., cat, hat, mat, etc.) may be perfectly successful for a child

capable of Level 4 type reasoning. But of what use would the same lesson be to a child at Level 2, who typically cannot accept a string of two letters as something "for reading" and for whom the concepts "word" and "letter" are still confused?

Innovation in curriculum design is called for. It is the schools' responsibility to develop teaching methodologies and instructional techniques with the objective of facilitating the development of graphic sense and to respond appropriately to each child's level in that development. In this way, children from every background would be provided equal access to the acquisition of literacy.

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APPENDICES

Appendix A

GRAPHIC SENSE CARD SORTING TASK

Instructions

SHOW THE CHILD THE FULL STACK OF CARDS. SAY:

Here are some cards. Some of these cards are for reading and some of them are just for looking at.

(IF THE CHILD SAYS SOMETHING LIKE, "But I can't read," SAY: That doesn't matter. If you think a grown up person could read them, like your teacher or your mom or dad, then they are for reading. Otherwise, they are not for reading.)

What I want you to is show me which cards are for reading and which are just for looking at. Put all the cards for reading over here (SHOW THE CHILD WHERE THE CARDS ARE TO BE PLACED) and put the cards for looking at over here.

Look at this first card. Do you think this is for reading?

All right, put it over here. (BE CAREFUL NOT TO EXPRESS APPROVAL OR DISAPPROVAL BY YOUR REACTION) Now look at this card. Is this one for reading? All right, put it here. (SHOW THE CHILD WHERE IT GOES.)

Now you do the rest. Put the cards for reading here, and the cards that are not for reading here. You might see some cards that are the same, but that's all right. Just put each card where you think it goes.

FROM TIME TO TIME (e.g. EVERY 5 CARDS IN THE BEGINNING AND EVERY 10 CARDS LATER) REMIND THE CHILD WHICH STACK IS WHICH. POINT TO THE STACKS AND SAY:

Remember, over here is for reading and over here is not for reading.

WHEN THE CHILD HAS FINISHED SORTING THE CARDS, SHOW THE "READING" STACK AND SAY:

What makes all these cards good for reading and not all these other ones ?

THEN SHOW THE STACK THAT IS "JUST FOR LOOKING AT" AND SAY:

Let's look at these cards one at a time. (PICK UP THE FIRST ONE AND SHOW IT TO THE CHILD.)

Tell me why you put this card here. (CONTINUE) What about this one?

WRITE THE CHILD'S RESPONSES VERBATIM ON THE TEST PROTOCOL. FOR CARDS THAT APPEAR FOR THE FIRST TIME IN DECK II, WRITE THE RESPONSE AND IDENTIFY IT BY WRITING (II) BEFORE THE RESONSE.

TAREA SOBRE SELECCION DE TARJETAS PARA SENTIDO GRAFICO

Instrucciones

ENSENELE AL NINO LA PILA COMPLETA DE TARJETAS. DIGA:

Aqui estan unas tarjetas. Algunas de estas tarjetas son para leer y otras son nomas para verlas.

(SI EL NINO DICE ALGO COMO, "pero yo no puedo leer," DIGA "Eso no importa. Si piensas que una persona mayor, como tu maestra o tus padres, podria leerlas, entonces son para leer. Si no, no son para leer.")

Lo que quiero es que me ensenes cuales tarjetas son para leer y cuales son nomas para ver.

Pon las tarjetas para leer aqui, (ENSENELE AL NINO EL LUGAR DONDE DEBE PONER LAS TARJETAS) y pon las tarjetas que son nomas para ver aqui.

Mira la primera tarjeta. Crees que esta es para leer?

Entonces, ponla aqui. (TENGA CUIDADO DE NO REACCIONAR NI POSITIVA NI NEGATIVAMENTE A LA DECISION DEL NINO.)

Ahora, mira esta tarjeta. Es para leer?

Ponla aqui. (ENSENELE AL NINO DONDE PONERLA.)

Ahora tu haz las demas. Pon las cartas para leer aqui, y las que no son para leer aqui. Podras ver algunas que son iguales, pero eso no importa. Ponlas donde tu creas que deben estar.

DE VEZ EN CUANDO (CADA CINCO TARJETAS AL PRINCIPIO, Y CADA DIEZ TARJETAS DESPUES), RECUERDELE AL NINO CUAL PILA ES CUAL. SENALE LAS TARJETAS Y DIGA:

Recuerda, estas son las de leer, y estas no son para leer.

CUANDO EL NINO HA TERMINADO SEPARANDO LAS TARJETAS, ENSENELE LA PILA PARA LEER Y DIGA:

Por que son estas tarjetas buenas para leer y por que estas otras no son buenas para leer?

ESCRIBA EXACTAMENTE LO QUE DIGA EL NINO. ENTONCES, ENSENELE LA PILA DE LAS QUE NO SON PARA LEER. DIGA:

Vamos a mirar cada una de estas tarjetas que no son para leer.

LEVANTE LA PRIMERA Y ENSENESELA AL NINO. DIGA:

Dime por que no se puede leer esta.

CONTINUE: Esta, por que no se puede leer?

ESCRIBA LAS RESPUESTAS DEL NINO EXACTAMENTE COMO LAS DIJO.

PARA LAS TARJETAS QUE APARECEN POR PRIMERA VEZ EN LA PILA II, IDENTIFIQUELAS ESCRIBIENDO (II) ANTES DE LA RESPUESTA.

Appendix B

GRAPHIC SENSE CARD SORTING TASK, Spanish Version

Child's Name_____Age_____Date_____

General Distinction_____

1. luna
2.
3. mmm
4. LUNA
5. en la luna
6. luna
7. sol
8. 4
9. sand
10. @+!*
11. luna

12.

13.

14.

15.

16.

17.

18.

19.

20.

21.

22.

23.

24.

25. 5348

26. un

27. Luna

28. l≠≠a

29. azul

30. قَمَر

31. nnnn

32. en labuna

33. lune

34. a

GRAPHIC SENSE CARD SORTING TASK, English Version

Child's Name_____ Age_____ Date_____

General Distinction_____

1. sand
2.
3. m n mn
4. SAND
5. in the sand
6.
7.
8.
9. luna
10.

11. sand
12. E
13. inthesand
14. and
15. 国
16. sand
17. mmm
18. d
19. vand
20. ПУНА
21. sdna
22. EФЭδ
23. sand

24. aaaa

25. 5348

26. an

27. sand

28. ɔɯɐd

29. dnas

30. ةَمُرْ

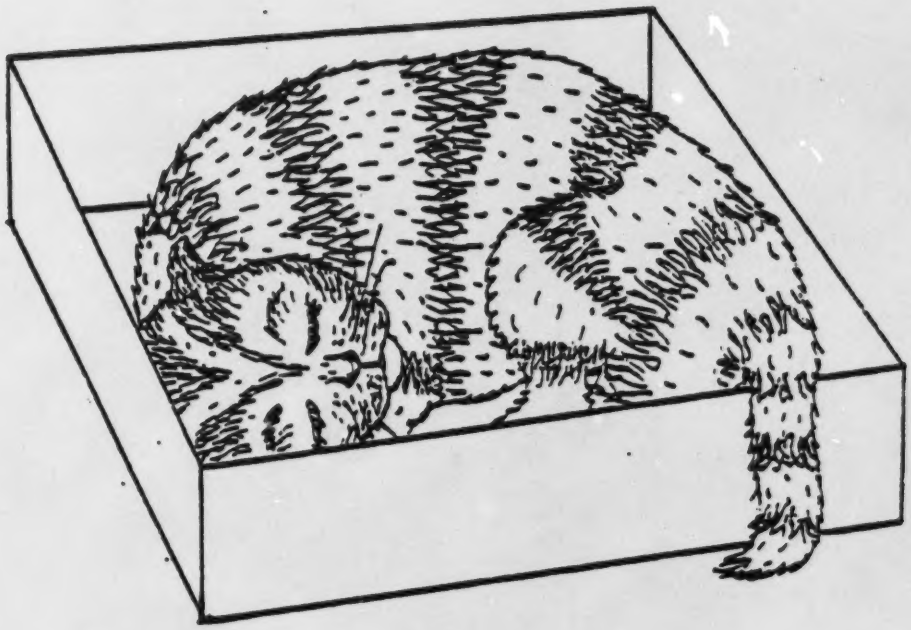
31. dddd

32. in thesand

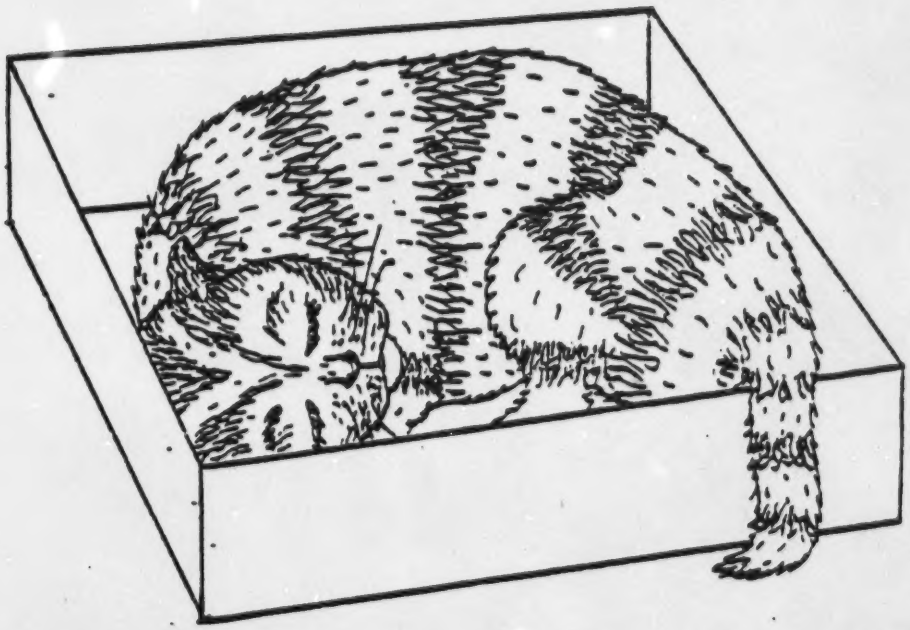
33. tune

34. a

El gatito quebró la taza.



El gatito se durmió en la caja.



The kitten fell asleep in the box.

The kitten broke the cup.

Appendix D

GRAPHIC SENSE STRUCTURE LOCATION TASK

Child's Name _____ Grade _____

Picture A

1. (Picture) _____
2. (Written Sentence) _____

2a. (Location of Sentence) THE KITTEN BROKE THE CUP

3. (Segments of Child's Utterance) _____
_____
_____

4. (Location of Segments) THE KITTEN BROKE THE CUP
the cup: _____
broke the cup: _____
the kitten: _____
broke: _____
the: _____

Picture B

1. (Picture) _____
2. (Written Sentence) _____

2a. (Location of Sentence) THE KITTEN FELL ASLEEP IN THE BOX

3. (Segments of Child's Utterance _____
_____
_____

4. (Location of Segments) THE KITTEN FELL ASLEEP IN THE BOX
fell asleep: _____
asleep: _____
fell: _____
the kitten: _____
kitten: _____
the: _____
fell asleep in the box: _____
in the box: _____
the box: _____
box: _____
the: _____
in: _____

GRAPHIC SENSE STRUCTURE LOCATION TASK

Child's Name _____ Grade_____

Picture A

1. (Picture) _____
2. (Written Sentence) _____

2a. (Location of Sentence) EL GATITO QUEBRO LA TAZA

3. (Segments of Child's Utterance) _____
_____
_____

4. (Location of Segments) EL GATITO QUEBRO LA TAZA
la taza: _____
taza: _____
quebro la taza: _____
el gatito: _____
el: _____

Picture B

1. (Picture) _____
2. (Written Sentence) _____

2a. (Location of Sentence) EL GATITO SE DURMIO EN LA CAJA

3. (Segments of Child's Utterance) _____
_____
_____

4. (Location of Segments) EL GATITO SE DURMIO EN LA CAJA
se durmio: _____
durmio: _____
se: _____
el gatito: _____
gatito: _____
el: _____
se durmio en la caja: _____
en la caja: _____
la caja: _____
caja: _____
la: _____
en: _____

Appendix E

SOCIO-GRAPHIC INTERVIEW

I. Background

A. Family Structure (who lives in the home)

1. Child's Parents

2. Sibling (ages)

3. Others living in the home

4. Regular visitors

B. Residency

1. Child's Parents

a. Birthplace of each

b. General residence history of family (when they first came to the U.S., pattern of migration since then)

2. Focus child

a. Birthplace

b. Residence(s) since birth of focus child

c. Regular visits to Mexico

C. Education

1. Of child's parents (where, for how long)

2. Of focus child

D. Employment of parent(s)/siblings/other adults in the home

1. Type of work

2. Regularity of employment

E. Health history (of focus child)

1. Physical (any serious illness or defect)

2. Emotional (childhood trauma, e.g., death, fright, separation)

F. Parent perception of a typical day in the life of the focus child

1. School day

2. Non-school day

II. Language Development

A. Bilingualism

1. Simultaneous or sequential

2. If sequential, at what age did the focus child first experience "meaningful" exposure to L2 (at what age did the child come into contact with speakers of L2 on a regular basis)

3. Under what conditions (e.g., school entry, move)

B. History of Language Development (L1 and L2 , if applicable)

1. Rate of development

a. At what age (in months, if possible) did the focus child first:

-ask for something (e.g., milk, a toy)
-report on an event (something that happened before or else where)
-express an understanding of cause and effect relationship by use of words like "why" and "because"
-count (to 3, to 10, to 20) (for younger children)
-say (or sing) the alphabet "does your child...")

b. -recognize written numbers "
-recognize letters (e.g., in name) "
-scribbling, drawing, coloring "
-write numbers, letters, name "

2. Formalized verbal interactions (L1 and L2 , if applicable)

a. Does the focus child participate in verbal "games" such as:

-nursery rhymes
-riddles
-songs, chants (e.g., of jumprope games)
-other (specify)

b. If so, since what age and under what circumstances (e.g., with family, with sibling, with playmates)

C. Parent perception of focus child's proficiency in each language

1. Relative strength of the two languages

2. Awareness of a "shift" in dominance (e.g., L1 L2)

3. Characteristics of shift (behaviors of child that made shift evident)

4. If so, at what age and possible reasons

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5. Parent perception of L1 loss

6. Relative strength of language compared to other kids (oral and written).

III. Attitudes of Parents

A. Aspirations for focus child's success in:

1. Academic pursuits

2. Career

a. What would parent like child to be.

b. What would parent like child not to be

3. Social life

a. Regarding friends with other ethnic group

b. reaction to child marrying member of other group

B. Importance of proficiency in each language. Ask about L2 first, then L1. Respondent to answer "very important", "somewhat important", "Not important."

1. Educational opportunity

a. Basic high school education

b. For a full, well rounded education

2. Career opportunity

3. Cultural opportunity (understanding and participating in cultural events; appreciating literature, art, music)

4. Social relationships (making friends with children of other ethnic group, visiting, staying the night, etc.)

C. Parents perception of child's motivation to learn L2 and/or to keep L1

IV. Language Use Patterns (Respondent is to answer "only Spanish/English", "mostly Spanish/English", or "about the same of each".)

A. In the family

1. Between parents

2. Between each parent and focus child

3. Between each parent and older sibling

4. Between each parent and younger sibling

5. Between focus child and older sibling

6. Between focus child and younger sibling

7. Among relevant others (e.g., other adults in the home, regular visitors)

B. Outside the family

1. Parents

a. Contexts in which parents use (need to use) L2

b. Presence of focus child in above situations

2. Focus child

a. Language use with playmates

b. In the community

V. Literacy (Ask about each language where it is relevant)

A. Who is literate in which language (estimate of proficiency)

B. Who reads/writes what, when and how much

C. "Social" literacy experience of focus child (dyadic or group activity, e.g., oral reading of storybooks, the Bible, the T.V. Guide, etc.)

"Social" writing activities (letters, notes, homework, etc.)

D. Availability of materials

1. Kinds and quantity of reading material (books, periodicals, posters)

2. Kinds and quantity of writing materials (e.g., stationary, pens, etc.)

E. Response of focus child to print

1. Does the focus child

-pretend to read
-choose to look at/read books
-ask to be read to and if so, since what age

2. Does the focus child comment on written language (e.g., regarding road signs, labels, etc.) and if so, since what age

3. Does the focus child comment on own pgoductions

VI. Electronic Media

A. Presence in the home

B. Use by various family members (when and how much)

1. Relative use in each language

2. In which language

ENTREVISTA SOCIO-GRAFICA

I. Antecedentes Históricos

A. Estructura Familiar (quién vive en el hogar)

1. Nombre de los padres.
2. Edades.
3. Otras personas viviendo en la casa.
4. Visitas frecuentes.

B. Residencia

1. Padres del niño.

a) Lugar de nacimiento de cada miembro de familia, desde los abuelos paternos y maternos hasta el niño.
b) Residencia(s) desde que nació el niño y motivo de residencia en Calistoga.
c) Visitas regulares a México.

C. Educación

1. Escolaridad de los padres del niño (dónde y por cuánto tiempo).
2. Escolaridad del niño y demás miembros de familia (hermanos).

D. Empleo de los padres, personas solteras y otras personas adultas que vivan en la casa

1. Clase de trabajo.
2. Regularidad del empleo.

E. Historia clínica de salud del niño

1. Enfermedades físicas (alguna enfermedad fuera de lo normal o defecto).
2. Enfermedades emocionales (algún acontecimiento o suceso que lo haya afectado emocionalmente, como separaciones, fallecimientos, fricciones, etc.)

F. Percepcion de los padres en un día típico de actividades del niño

1. Día escolar (entre semana).
2. Día no escolar (fines de semana o vacaciones).

II. Desarrollo del idioma

A. Bilingüismo

1. Simultaneidad o secuencia del idioma.
2. A qué edad el niño realizó la primera experiencia notoria del uso de un segundo idioma (y qué edad tenía el niño cuando empezó a estar en contacto con personas que hablaban un segundo idioma en bases regulares).
3. Sobre qué condiciones (cambio de escuela, traslado a otra ciudad, etc.).

B. Desarrollo histórico del idioma (primer idioma y segundo idioma; si es aplicable)

1. Registro de desarrollo logrado.

a) A qué edad el niño (si es posible en meses) realizó:
-emitió sus primeros sonidos
-emitió sus primeras palabras
-entendió las cosas y sus efectos al referirse a un acontecimiento o suceso, y preguntó el POR QUE del mismo
-empezó a reconocer los números y a contar
-supo el alfabeto y reconoció las letras, y las identificó en un nombre
-coloreó y dibujó por primera vez
-hizo sus primeros garabatos y efectuó un cambio en su escritura
-escribió su nombre

2. Formal intercambio verbal (primer idioma y segundo idioma si es aplicable).

a) Participa el niño en "juegos" verbales como:
-canciones infantiles
-adivinanzas
-refranes
-sonsonetes
-algún otro (especifique)

b) Si es así, desde qué edad y bajo qué circunstancias (si con familiares, hermanos, compañeros)

C. Percepción de los padres en la proficiencia del niño en idiomas

1. Fuerza relativa de los dos idiomas.
2. Conocimiento en un "cambio" en el dominio (del primero al segundo idioma).
3. Características del cambio (conducta del niño que hizo evidente este cambio).
4. Si es así, a qué edad y razones posibles.
5. Percepción de los padres en la pérdida del primer idioma.
6. Fortaleza relativa del idioma comparado al de otros niños (oral y escrito).

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III. Actitudes de los padres

A. Aspiraciones para el éxito del niño en:

1. Logros académicos.
2. Carrera.
   a) Qué les gustaría a los padres que su niño fuera.
   b) Qué les gustaría a los padres que su niño no fuera.
3. Vida social.
   a) Referente a amigos con otros groupos étnicos.
   b) Reacción si el niño se casara con un miembro de otro grupo.

B. Importancia de la proficiencia de cada idioma. Preguntar acerca del segundo idioma primero, después acerca del primer idioma. Deben responder "muy importante", "poco importante", "no importante".

1. Oportunidad educativa.
   a) Educación básica secundaria.
   b) Por una completa, sólida educación.
2. Oportunidad económica.
3. En oportunidad cultural (entendiendo y participando en eventos culturales; apreciando literatura, arte, música).
4. Relaciones sociales (haciendo amigos con niños de otro grupo étnico, visitas, pasar la noche en casa de amigos, etc.)

C. Percepción de los padres en el deseo del niño en aprender el segundo idioma y/o conservar el primer idioma

IV. Modelos del idioma usado (debe responder "solamente español/inglés", "la mayor parte español/inglés", o "casi lo mismo de cada idioma").

A. En la familia

1. Entre los padres.
2. Entre cada padre y el niño.
3. Entre cada padre y el niño mayor.
4. Entre cada padre y el niño mas joven.
5. Entre el niño y el mayor.
6. Entre el niño y el menor.

B. Fuera de la familia

1. Padres.
   a) Casos en los cuales los padren usan (necesitan usar) el segundo idioma.
   b) Si el niño está presente en los casos mencionados.
2. Niño.
   a) Idioma usado con sus compañeros.
   b) En la comunidad.

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V. Preguntar acerca de cada idioma, donde esto es relevante.

A. En qué idioma lee el niño

B. Qué lee, qué escribe, cuándo y cuánto

C. Socialmente, si tienen diálogos, si leen historias de libros, la Biblia, la T.V. guide. Acostumbran a dejar recados o alguna comunicación escrita en casa; con qué frecuencia lo hacen; si acostumbran escribir con qué frecuencia lo hacen.

D. Material disponible

1. Si se interesa el niño en leer libros, periódicos, posters, rótulos en las calles, marcas en los supermercados.

2. Si tiene disponible el niño materiales para escribir, como lápices, plumas, lapiceros, tiza, etc.

E. Cómo responde el niño a lo escrito

1. Si el niño:

a) Hace como que lee.
b) Escoge libros para leer.
c) Pide que le lean y si es así, desde qué edad.

2. Qué dice el niño acerca de señales, comerciales, rótulos. Interés sobre el lenguaje escrito.

VI. Aparatos

A. Qué clase de aparatos tienen en casa.

1. Si los usan con frecuencia.

2. Si tienen televisión, en qué idioma la ven.

3. Hay algún momento en el cual ven el canal en español.

4. Si tienen discos, o cuando oyen canciones, en qué idioma las oyen.

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Appendix F

SOCIOGRAPHIC INTERVIEW
DATA SUMMARY FORM

No Response= NR
Doesn't know= DK

I.D. _____
Student: _____
Birthdate: _____

Persons in Household	✓	Age	Birthplace	Nationality of grandp.	Years of Schooling Mex.	Years of Schooling U.S.	Kind of work	1.Regular	2.Seasonal
Focus child									
Mother									
Father									
Other Guardian									
Maternal Grandmother									
" Grandfather									
Paternal Grandmother									
" Grandfather									
Other Adults									
A.									
B.									
C.									
Siblings									
A.									
B.									
C.									
D.									
E.									
F.									

* For two focus children make two summary forms, but fill out full information for 1 child only

Persons in Household	✓	Age	Birthplace	Nationality of grandp.	Years of Schooling Mex.	U.S	Kind of work	1.Regular	2.Seasonal
Other children									
A.									
B.									
C.									
D.									

Comments: _____

_____

_____

Visitors to the home	Frequency Daily 4	Weekly 3	Monthly 2	Annually 1	Length of visit	Major Language 1.Span.	3.Both	5.Eng.
A.								
B.								
C.								
D.								
E.								
F.								

Comments: _____

Residence History

Place of Residence	Years	Members of Fam.	Reasons
A.			
B.			
C.			
D.			

Child's Health

a. Physical Ailments _____

_____

b. Emotional Traumas _____

_____

Bilingualism of Child	1.From infancy	Pre-school or 2.Early Childhood	3. At school entry	4.Later (date)
Contact with Spanish				
Contact with English				

Conditions under which L2 learned _____

_____

_____

Comments: _____

Age at which child first	In Spanish	In English
1. Asked for something		
2. Reported an event		
3. Produced sounds		
4. Produced words		
5. Expressed "why" questions		
6. Produced numbers 1-3		
7. Produced numbers 1-10		
8. Produced numbers 1-20		
9. Said or sang the alphabet		
10. Recognized written numbers		
11. Recognized letters		
12. Drew or colored		
13. Scribbled		
14. Wrote letters		
15. Wrote numbers		

Comments: _____

_____

Does child produce in English	since what age	with self	with siblings	with friends	with family	how often
1. Commercial jingles						
2. Nursery rhymes						
3. Riddles						
4. Songs						
5. Chants						
6. Word games						
7. Other						

Does child produce in Spanish	since what age	with self	with siblings	with friends	with family	how often
1. Commercial jingles						
2. Nursery rhymes						
3. Riddles						
4. Songs						
5. Chants						
6. Word games						
7. Other						

Comments: _____

Language Proficiency	Spanish	English
0. None		
1. A little		
2. Quite a bit		
3. Fluently		

Shift in dominance: 1.Yes _____ 2.No_____ Age_____

Characteristics of Shift: _____

_____

Reasons for shift: _____

_____

Parent attitude toward shift: _____

_____

Language proficiency related to other children	L1 English	L2 English	L1 Spanish	L2 Spanish
1. Less				
2. More				
3. Same				
4. Doesn't know				

Comments: _____

Academic aspirations for child _____

_____

Career aspirations for child _____

_____

Career rejected for child _____

_____

Friends desired for child: 1.Mexican____ 2.Anglo____ 3.Other____ 4.All____

Feelings if child marries outside group _____

_____

Importance of language for	Spanish 1.Not Important	2.Somewhat Important	3.Very Important	English 1.Not Important	2.Somewhat Important	3.Very Important
High school education						
Complete education						
Career opportunity						
Participation in community events						
Appreciation of fine arts						
Having friends of that language						

Comments: _____

Desire of child to learn L2: 0.None _____ 1.Weak _____ 2.Medium _____ 3.Strong _____

Desire of child to keep L1: 0.None _____ 1.Weak _____ 2.Medium _____ 3.Strong _____

Language Use Between	1 Spanish only	2 Mainly Spanish	3 Both about the same	4 Mainly English	5 English only
Parents					
Father-Focus child					
Father-Older siblings					
Father-Younger siblings					
Mother-Focus child					
Mother-Older siblings					
Mother-Younger siblings					
Focus child-Older sib.					
Focus child-Younger sib.					
Focus child-Friends					
Focus child-Others					

Occasions when parents use other language _____

_____

In which of these is child present _____

_____

Literacy	Spanish Proficiency				English Proficiency			
	0.None	1.Low	2.Medium	3.High	0.None	1.Low	2.Medium	3.High
Father								
Mother								
Other Guardian								
Other Adult								
Other Adult								
Other Adult								
Focus child								
Older sibling								
Older sibling								
Older sibling								
Older Other child								

What is read (individually)	By whom	Frequency

What is written (individually)	By whom	Frequency

Social Reading activities	Participants	Frequency

Social writing activities	Participants	Frequency

Comments: _____

Type of printed written material available in the home	Quantity 1.Few	2.Several	3.Many	4.

Types of writing materials available in the home	Quantity 1.Few	2.Several	3.Many	4.

Responses of Child to Print	Examples	Frequency	Since what age
Pretend to read			
Look at books			
Read books			
Read other material			
Comment on signs			
" on labels			
" on own writing			
" on drawings			
" on homework			

Media	By whom used [redacted]	Frequency	By whom used [redacted]	Frequency
TV				
Radio				
Record player				
Tape player				

Comments: _____